# SCCARA-GRAM

Santa Clara County
Amateur Radio Association

Volume 27, Number 9 September 2011

## President's Prose

The August 20 annual picnic was a success with 30-35 attendees. Thanks to Lou (WA6QYS), Gwen (KF6OTD), Clark (KE6KXO), Gregg (KF6FNA), Wally (KA6YMD) and Don (K6PBQ) for their efforts in getting things set up. Four stations were on the air, all on emergency power. Reg (K6SSJ) was there with his "go-kit", completely self-contained and solar powered with equipment for 160 meters thru 70 cm. His setup is an outstanding example of electrical and mechanical design and construction.

The August 8 general meeting was almost standing room only with 31 folks in attendance. We were in an alternate location in the Kaiser Hospital basement, which worked out fine. The speaker was Herb Sullivan (K6QXB) from Santa Rosa who spoke on AMSAT. His presentation generated considerable interest - so much so that your Board voted on August 15 to make a donation to AMSAT. I don't recall that Herb mentioned it, but there is an article entitled "Get Ready for ARISSat-1" on pages 30-33 of the February 2011 QST. If you're interested and don't have the magazine, let me know and I'll make a copy for you.

The 45th annual California QSO Party takes place from 1600 UTC October 1 to 2200 UTC October 2. It's sponsored by the Northern California Contest Club. It's one of the events I participate in if I'm available. The objective is for other states to contact as many California stations as possible, so you can be sure of plenty of contacts. Go for it. *{See CQP article below. – Ed}*

It's time to start thinking about officers and directors for next year. Nominations are scheduled for October, 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.

Part IV of my multipart article on transmission lines and SWR will appear in this issue of the SCCARA-GRAM, provided Gary can work it in. There will be at least one more part before it wraps up.

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.

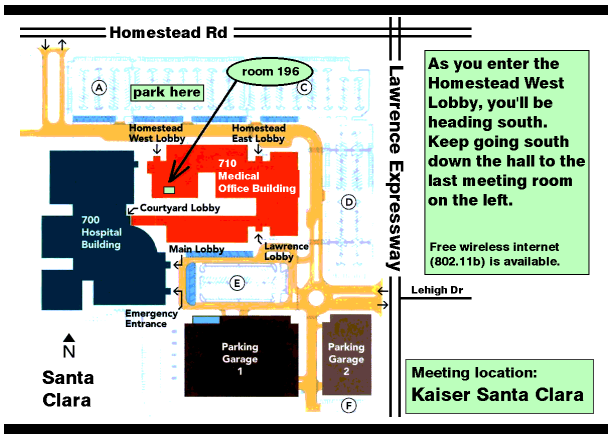
73,
Don - AE6PM

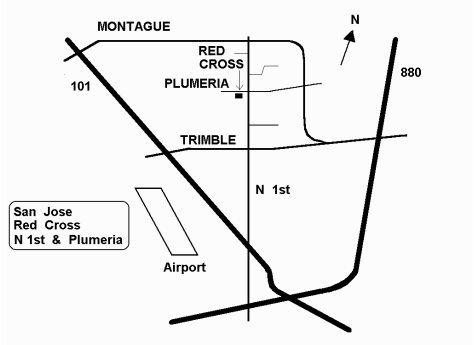
## Calendar

**9/10** **DeAnza electronic flea market**
**9/12** **SCCARA General Meeting**
**9/19** **SCCARA Board Meeting**--(San Jose Red Cross, 7:30p, all are welcome)

## General Meeting

Day: Monday, Sept. 12, 2011
Time: 7:30 PM
Place: Kaiser Santa Clara, Rm 196
Featuring: Kristen McIntyreK6WX will talk about PSK-31for the smart phone



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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.**



# Transmission lines and SWR - part IV

## By Don Steinbach, AE6PM

Standing waves on the transmission line occur when the characteristic impedance of the transmission line is not the same as the antenna impedance at the point where the two are connected. In that case, not all of the incident (forward) power from the transmission line is accepted by (and radiated by) the antenna and the difference is reflected back down the transmission line toward the source. It's commonly assumed that the reflected power is lost forever, but that's not the case. The reflected power is reflected again when it reaches the source, this time back toward the antenna, because the source impedance is not exactly equal to the transmission line impedance. Now, practical transmission lines always have some loss, so the wave being reflected back and forth becomes smaller with each round trip. The energy bounces back and forth inside the transmission line until it's all radiated by the antenna or absorbed by losses in the transmission line. The bottom line is that the power lost due to SWR is directly related to the loss in the transmission line. This is why antennas having a very high SWR, but fed with low-loss transmission line (such as open-wire line) can be very efficient and highly effective.

### Excessive Reactance

Remember, though, that if the antenna feed-point impedance consists of reactance as well as resistance (which it undoubtedly does) any capacitive reactance can result in high currents and any inductive reactance can result in high voltages. Unfortunately, these reactive parts of the antenna impedance do not absorb or radiate power (remember AC Circuits 101?), but they do result in these undesirable side effects. If your antenna system tries to self-destruct, is arcing, or your balun explodes, look for a significant reactance term in the antenna impedance that could result in unusually high voltages or currents.

### Transmission Line Loss SWR Masking Effect

Loss in the transmission line manifests itself in other ways such as masking the true SWR at the antenna. Specifically, the SWR seen at the transmitter end of the transmission line will appear to be lower than it really is at the antenna because of the increased return loss. For example, if the loss in the transmission line is 3 dB, a SWR of 2 at the transmitter translates to a SWR of 5 at the antenna and a SWR of 3 at the transmitter translates to a SWR of over 100 at the antenna. These examples are admittedly extreme, but they serve to illustrate my point, which is that a lossy transmission line makes the impedance match at the antenna appear better than it really is.

The relationship between the SWR at the input (transmitter) end of the line and the SWR at the load (antenna) end of the line is:

SWR at input = $(a + |\rho|) / (a - |\rho|)$

Where:

$a = 10^{ML/10} = 10 \text{ ^ } (ML/10)$

$|\rho| = (SWR - 1)/(SWR + 1)$

ML = Matched-line loss of the transmission line in dB
SWR = SWR at the load (antenna)
(Ref: ARRL Handbook for Radio Communications, 82nd Edition, page 21.6)

See Table 1 for some calculated values. Note that as the transmission line loss (matched-line loss) increases, the SWR as measured at the transmitter becomes vastly different from the SWR that would be measured at the antenna.

| | Matched-Line Loss | | | | | | |
|---|---|---|---|---|---|---|---|
| SWR at Ant. | 0.5 dB | 1 dB | 2 dB | 3 dB | 4 dB | 5 dB | 6 dB |
| | SWR at Transmitter | | | | | | |
| 1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 1.5 | 1.43 | 1.38 | 1.29 | 1.22 | 1.17 | 1.14 | 1.11 |
| 2 | 1.85 | 1.72 | 1.53 | 1.40 | 1.31 | 1.24 | 1.18 |
| 2.5 | 2.24 | 2.03 | 1.74 | 1.55 | 1.41 | 1.31 | 1.24 |
| 3 | 2.61 | 2.32 | 1.92 | 1.67 | 1.50 | 1.38 | 1.29 |
| 4 | 3.30 | 2.82 | 2.22 | 1.86 | 1.63 | 1.47 | 1.35 |
| 5 | 3.93 | 3.25 | 2.45 | 2.00 | 1.72 | 1.53 | 1.40 |
| 6 | 4.50 | 3.62 | 2.64 | 2.12 | 1.79 | 1.58 | 1.44 |
| 7 | 5.03 | 3.95 | 2.80 | 2.20 | 1.85 | 1.62 | 1.46 |
| 8 | 5.52 | 4.23 | 2.93 | 2.28 | 1.90 | 1.65 | 1.49 |
| 9 | 5.97 | 4.49 | 3.04 | 2.34 | 1.93 | 1.68 | 1.50 |
| 10 | 6.39 | 4.71 | 3.13 | 2.39 | 1.97 | 1.70 | 1.52 |

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

**Determining the Transmission Line Loss**

In order to calculate the SWR at the antenna from the SWR measured at the transmitter end, the matched-line loss of the transmission line at the frequency of interest must be known. This can be estimated from the manufacturers' published data or it can be determined experimentally (i.e., measured). Regardless of method, the matched-line loss should be determined at the frequency at which the antenna is going to be used. An actual measurement the matched-line loss of the transmission line is preferred, but that requires that both ends of the transmission line be accessible. If that's not possible, then an estimate based on the manufacturers' published data plus knowledge of the actual physical length of the transmission line is the only other alternative.

**Method 1 (Estimated from Published Data):** The matched-line loss varies with frequency and the published data will probably not be at the frequency of interest so a correction is required. If the frequency at which the loss is specified is $F_1$ and the matched-loss at that frequency is $A_1$, then the matched-loss ($A_0$) at the frequency of interest ($F_0$) is approximately equal to:

$A_0 = A_1 \text{ sqrt } (F_0/F_1)$

The product of $A_0$ times the transmission line physical length equals the loss. The published data probably has units of dB per 100 feet, so scale the loss for the length of your transmission line accordingly.

**Method 2 (Direct Measurement):** Direct measurement of the matched-line loss is accomplished by measuring the magnitude of the reflection coefficient, or alternatively, the SWR at one end of the transmission line while the other end is either open- or short-circuited. Since all of the power that reaches the short- or open-circuit will be reflected back toward the source, the matched-line loss of the cable will be half the return loss resulting from this measurement.

Method 2 is best done with an antenna analyzer that reports the reflection coefficient or the return loss rather than the SWR since the theoretical SWR will be infinite whereas the reflection coefficient ($\rho$) will be about 1 or the return loss will be about zero. An SWR meter or SWR bridge will simply read full-scale. See Table 1 of Part III for examples.

For best accuracy, the impedance of the analyzer should be equal to the complex characteristic impedance of the transmission line. Most analyzers have a choice of 50 or 75 ohms, resistive (mostly, since there will always be some reactance present), and we'll live with that even though it may not perfectly match the transmission line. After all, we're not trying to land a man on the moon. Also, make two measurements: one with the far end open-circuited and one with the far end short-circuited and use the arithmetic average of the two (i.e., add them up and divide by two).

**"My Feedline Tunes My Antenna"**

This is the title of an article in the March 1956 issue of QST where the author (Byron Goodman, W1DX) addresses the possible impedance transforming effect of the transmission line, much as has been done here, and how changing the length of the transmission line can affect the SWR, leading to the misconception that this has somehow "tuned" the antenna. His objective is to dispel that incorrect notion (among others).

Keep in mind that the antenna is a fixed physical object with predictable and measurable electrical characteristics that can only be changed by modifying its physical properties or its environment. No magical twisting of knobs or adding networks at the station-end can alter the characteristics of the antenna proper. Adding an impedance transforming network between the transmission line and the antenna or between the transmitter and the transmission line, or both, is the only way to alter the perceived electrical characteristics of the antenna.

**Transmission Line Properties (More)**

In Part 3 under "Transmission Line Properties," I listed five transmission line properties of interest. I should have included a sixth:

The magnitude of the impedance measured at the free end of a one-eighth wavelength transmission line is almost exactly the magnitude of its characteristic impedance when the line is terminated with a resistance of any value.

**Errata:**

Three of the equations in Part 3 in the August 2011 SCCARA-GRAM took a hit in the publishing process. Specifically, the letter "r" was substituted for the greek letter rho ($\rho$). So, where you see r = , or |r| =, in the August issue, replace the r with $\rho$.

The corrected equations are:

$\rho = E_R/E_F = I_R/I_F = \text{sqrt}(P_R/P_F) = (Z_L - Z_0) / (Z_L + Z_0)$

$|\rho| = \text{sqrt}[((R_L - R_0)^2 + X_L^2) / ((R_L + R_0)^2 - X_L^2)]$

$|\rho| = \text{sqrt}[((50 - 50)^2 + (-j50)^2) /((50 + 50)^2 - (-j50)^2)]$

More next month … stay tuned.

Don – AE6PM

# ARRL News

From *The ARRL Letter*, August 18, 2011

2011 FIELD DAY LOGS POSTED

A record 2654 submissions have been received for the 2011 running of ARRL Field Day. According to ARRL Field Day Manager Dan Henderson, N1ND, this is the highest number of entries received for what is one of Amateur Radio's most popular on-the-air operating events. The combined list of Logs Received for Field Day has been posted online. The list includes all logs submitted via the website, as well as those submitted via e-mail and US Mail. Read more at www.arrl.org/news/2011-arrl-field-day-logs-posted.

ARRL AND CALIFORNIA RESEARCHERS TEAM UP TO END 12 METER INTERFERENCE

Coastal Ocean Dynamics Applications Radar (CODAR) situation on the East Coast, the ARRL noted an earlier report by John Terrell, N6LN, of Palos Verdes, California. Terrell described CODAR activity on the 12 meter band, from 24.93 to 25.058 MHz. Since it appeared likely it was originating on the West Coast -- possibly near Orange Section Official Observer Coordinator Dan Welch, W6DFW -- ARRL Field and Regulatory Correspondent Chuck Skolaut, K0BOG, contacted Welch for assistance.

With assistance from Richard Saunders, K6RBS -- an Official Observer from Mission Viejo, California -- Welch determined the CODAR transmissions were originating from an installation operated by the University of Southern California. “Dan contacted Burt Jones, a Professor of Research in the Marine Environmental Biology Department, and Lab Manager Matthew Ragan,” Skolaut explained. “The folks at USC were glad to cooperate and they promptly moved the transmitter frequency out of the amateur band.” Read more at www.arrl.org/news/arrl-and-california-researchers-team-up-to-end-12-meter-interference.

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From *The ARRL Letter*, August 25, 2011

ARRL FILES COMMENTS IN RESPONSE TO ANCHORAGE VEC'S WAIVER REQUEST

In April 2011, the Anchorage VEC -- one of 14 Volunteer Examiner Coordinators -- filed a Petition for Rule Making (RM-11629) that asked the FCC to give permanent credit to radio amateurs for examination elements they have successfully passed. This would, in effect, create a license exam credit that would be valid throughout an amateurs' lifetime, never expiring. On July 6, the Anchorage VEC submitted a Waiver Request with the FCC while RM-11629 is pending. This request asks that the FCC grant a blanket waiver ofSection 97.505 of the Commission's Rules to those radio amateurs whose licenses have expired -- and are beyond the two-year grace period for renewal -- to be afforded credit for examination elements previously passed. On August 11, the ARRL filed comments with the FCC, urging the Commission to dismiss or deny the Waiver Request. Read more at www.arrl.org/news/arrl-files-comments-in-response-to-anchorage-vec-s-waiver-request/.

HEATHKIT RETURNS TO THE KIT BUSINESS

A notice on the Heathkit website announces that the venerable kit manufacturer, well-known to all Amateur Radio operators of a certain age, will be reentering the kit business in late August. The notice states, in part: "Heathkit will debut their new line of Do-it-Yourself kits for common around-the-house items. The first kit will be a Garage Parking Assistant (GPA). The Garage Parking Assistant kit lets you build your own system that uses ultrasonic sound waves to locate your car as it enters the garage. The system signals to the driver using LED lights mounted on the wall when the car is detected and in the perfect spot for parking. Read more at www.arrl.org/news/ heathkit-returns-to-the-kit-business.

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# C Q P

California QSO Party contest

Whether done casually to give some points or as a serious effort, contesting provides a great learning experience for information copy "under fire".

The first weekend of October (October 1, 2) is the annual California QSO Party - a great opportunity for stations in California because everyone else HAS TO WORK US! We are the DX!

For California stations the object of the contest is to work as many stations as possible on SSB and CW. You can work the same station on each band and each mode for score credit. Every US state and Canadian province you work counts as a multiplier - 58 total for us just like the number of counties in California.

Low Power, High Power, CW or SSB, CQP is a fun contest for all.

Every station that submits a log is eligible for an achievement certificate and there are several operating categories where the leader receives a wooden CQP plaque for proud display on the shack wall.

CQP is sponsored by the Northern California Contest Club. You can find the full rules and award details on the CQP web site at http://www.cqp.org.

We hope you will join us this year and have a lot of Fun! Stu Phillips - K6TU

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# Meeting Minutes

## General Meeting, Aug. 8, 2011

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

Don Steinbach, AE6PM, called the meeting to order at 1935. There were 31 members and guests present.

Announcements: Electronics Flea Market August 13 (SVECS is sponsor). Station open at Red Cross August 27. AMSAT October 4-7. Pacificon October 14-16.

Business Items: None

Program: The remainder of the meeting was devoted to a presentation on AMSAT by Herb Sullivan (K6QXB) from Santa Rosa. . There are a number of satellite tracking programs such as SatPC available from AMSAT and others. Satellite pass predictions and Keplerian Elements are available on the amsat.org website. The ISS downlink can be heard on 145.8 MHz (independently of AMSAT). The ARISSat "how to" (operating

tips, etc.) can be found at www.amsat.org/amsat-new/ARISSat/ARISSSatHowTo.php.

The meeting adjourned at 2100 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 1940.

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 KF6FNA, John Glass NU6P

Absent: Secretary Viki Moldenhauer KI6WDS. Visitors: Gwen Steirer KF6OTD, Clark Murphy KE6KXO, Herman DeKruyff KI6ETZ

Announcements: Don AE6PM announced that the SCCARA-GRAM inputs are due to Gary no later than August 29.

Treasurer's Report: Checking = $3989.02; savings = $3847.30; cash = $189.25 for a total of $8025.57.

Secretary's Report: None. Approval of minutes was deferred to a future meeting.

Business Items:
The planned replacement of the 2-meter repeater antenna by the City of San Jose is now on hold until at least July of 2012 due to lack of funding. Alternate sites are being investigated by SCCARA.

Lou (WA6QYS) and Gregg (KF6FNA) are reviewing possible antenna modifications at the Red Cross.

Lou (WA6QYS) moved to allocate $50 for paint for the storage lockers. Seconded by Gregg (KF6FNA). Unanimous approval.

Gregg (KF6FNA) moved to make a donation to AMSAT, not to exceed $100. Seconded by Lou (WA6QYS). Unanimous approval.

No advance funds were allocated for the picnic. Actual expenses will be covered after the fact and were expected to be minor since soda, charcoal, etc., are already available.

The meeting was adjourned at 2027.

Submitted by Don Steinbach (AE6PM), President.

# Packet Pieces

### Downloaded from the BBS packet network:

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Date: 21 May 2010 11:54
From: W1GMF@W1GMF
To: HUMOR@USA
Subject: AARP questions and answers

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Q: Where can men over the age of 50 find younger, sexy women who are interested in them?

A: Try a bookstore under fiction.

---

Q: What can a man do while his wife is going through menopause?

A: Keep busy. If you're handy with tools, you can finish the basement. When you are done you will have a place to live.

---

Q: How can you increase the heart rate of your 50+ year old husband?

A: Tell him you're pregnant.

---

Q: How can you avoid that terrible curse of the elderly wrinkles?

A: Take off your glasses

---

Q: Seriously! What can I do for these crow's feet and all those wrinkles on my face?

A: Seriously? Go bra less. It will usually pull them out.

---

Q: Why should 50+ year old people use valet parking?

A: Valets don't forget where they park your car.

---

Q: Is it common for 50+ year olds to have problems with short term memory storage?

A: Storing memory is not a problem, retrieving it is a problem.

---

Q: As people age, do they sleep more soundly?

A: Yes, but usually in the afternoon.

---

Q: Where should 50+ year olds look for eye glasses?

A: On their foreheads.

---

Q: What is the most common remark made by 50+ year olds when they enter antique stores?

A: 'Gosh, I remember these.'

==========

Date: 29 May 2010 18:00
From: KG6BAJ@KG6BAJ
To: HUMOR@WW

Subject: health advice
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And now a word from our sponsor...

Do you have feelings of inadequacy?
Do you suffer from shyness?
Do you sometimes wish you were more assertive?
If you answered yes to any of these questions, Ask your doctor or pharmacist about Cabernet Sauvignon.

Cabernet Sauvignon is the safe, natural way to feel better and more confident about yourself and your actions. It can help ease you out of your shyness and let you tell the world that you're ready and willing to do just about anything.

You will notice the benefits of Cabernet Sauvignon almost immediately and, with a regimen of regular doses, you can overcome any obstacles that prevent you from living the life you want to live.

Shyness and awkwardness will be a thing of the past and you will discover many talents you never knew you had.

Stop hiding and start living.

Cabernet Sauvignon may not be right for everyone. Women who are pregnant or nursing should not use it. However, women who wouldn't mind nursing or becoming pregnant are encouraged to try it.

Side effects may include:
dizziness, nausea, vomiting, incarceration, loss of motor control, loss of clothing, loss of money, loss of virginity, delusions of grandeur, table dancing, headache, dehydration, dry mouth, and a desire to sing Karaoke and play all-night rounds of Strip Poker, Truth Or Dare, and Naked Twister.

WARNINGS:
* The consumption of Cabernet Sauvignon may make you think you are whispering when you are not.
* The consumption of Cabernet Sauvignon may cause you to tell your friends over and over again that you love them.
* The consumption of Cabernet Sauvignon may cause you to think you can sing.
* The consumption of Cabernet Sauvignon may make you think you can converse enthusiastically with members of the opposite sex without spitting.
* The consumption of Cabernet Sauvignon may create the illusion that you are tougher, smarter, faster and better looking than most people.

Please feel free to share this important information with as many people as you feel may benefit! Now just imagine what you could achieve with a good Shiraz .....

# 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.

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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
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# Newsletter Notes

At the end of this installment in Don's series on transmission lines, mention was made of a the ρ character (the Greek rho) being translated into 'r'. Sorry about that, Don.

This illustrates some of the problems translating something from one platform or editor to another. If at all possible, I ask for submissions to the newsletter to be in plain text to avoid formatting problems. But if there are a lot of special characters, more care needs to be taken. If something gets changed in the translation process, it can be hard to notice.

So, we can have more than just text and basic photos, but the formatting and layout becomes a partnership between the author and editor to get it all straight.

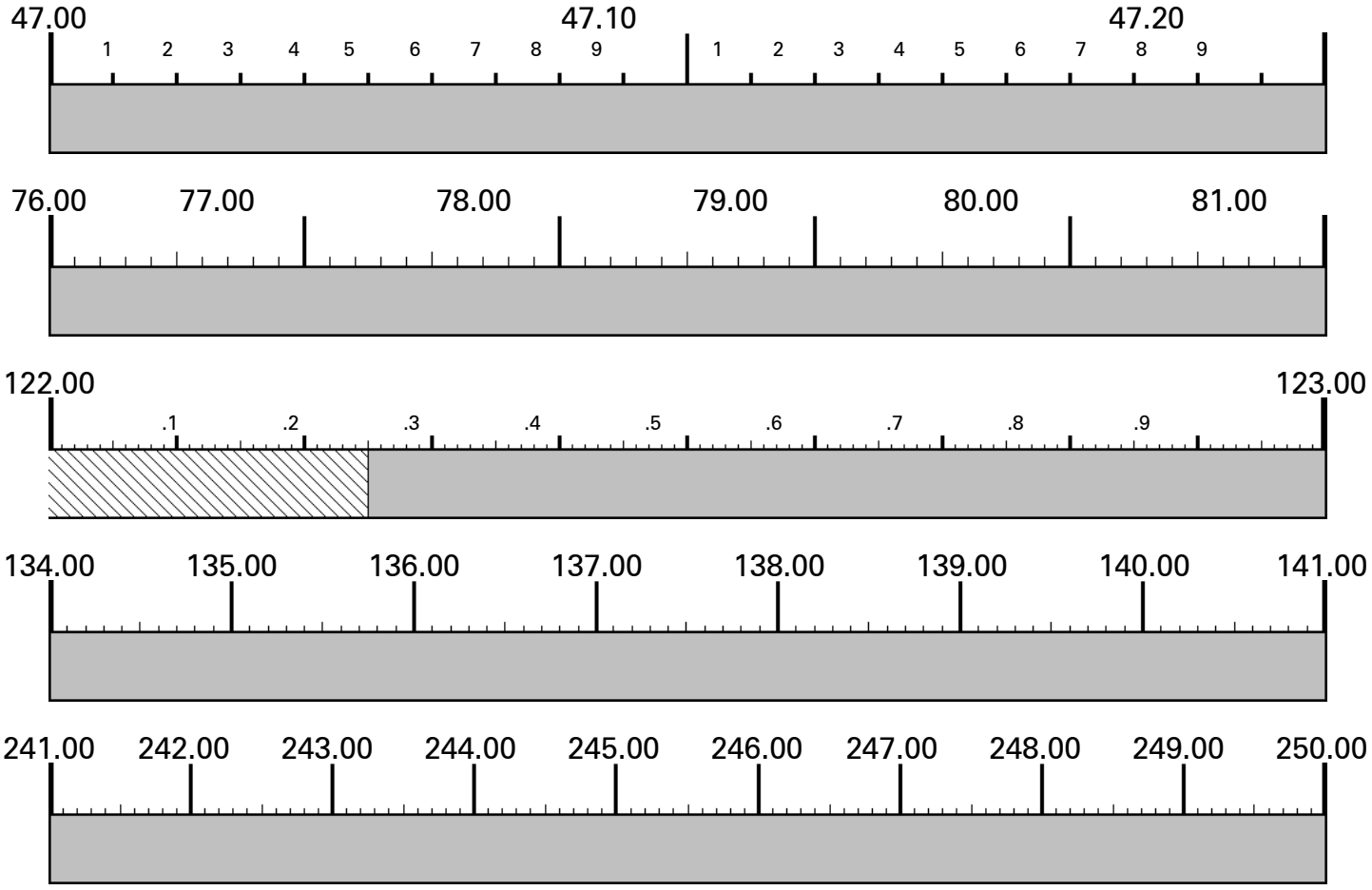
On another topic... This issue contains the highest bands of the band plan charts that have been published here since February. There's not much in the way of planning on these highest bands, all frequencies are experimental–hence just one color (gray) coded segments.

We started this with the two meter band (since it's one of the most popular), then six meters, and then we worked our way up. Next month we'll work our way down, below VHF.

73, Gary WB6YRU, editor

# EHF Band Plans for Northern California

## 6.4 mm, 47.00 - 47.20 GHz
## 3.8 mm, 76.00 - 81.00 GHz
## 2.4 mm, 122.25 - 123.00 GHz
## 2.2 mm, 134.00 - 141.00 GHz
## 1.2 mm, 241.00 - 250.00 GHz
## all above 275 GHz




All activity in the EHF and higher bands are: All Mode and Experimental

For general Amateur Radio, see ARRL (www.arrl.org)
San Bernardino Microwave Society (http://www.ham-radio.com/sbms/)
50 MHz & Up Group (San Francisco bay area) (http://www.50mhzandup.org/)

***SCCARA***
**S**anta **C**lara **C**ounty **A**mateur **R**adio **A**ssociation
PO Box 6
SAN JOSE CA 95103-0006

Affiliate of the ARRL,
American Radio Relay League

**FIRST CLASS**

**ADDRESS SERVICE REQUESTED**

# SCCARA Membership Form for 2011

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