# CROSSTALK

**News Bulletin of the TRW Amateur Radio Club**

Volume 96 Number 5 June 1996


# Field Day!

Field Day '96 will be the weekend of June 22nd and 23rd. According to the American Radio Relay League, Field Day is a time to sharpen your operating skills and practice emergency preparedness. It is also a contest. Probably the most popular contest, since it seems that everyone on every band is calling "CQ Field Day" for 24 hours!

In past years, the TRW Amateur Radio Club has worked Field Day with a passion! We not only have won our entry Class, but we have scored in the top 10 of all Field Day participants. Last year, we took a break from the die-hard contesting to use Field Day to introduce ham radio to as many people as possible. We did this by setting up at TRW, operating during TRW's open house, and making education a priority over contacts.

This year, we will return to our traditional Field Day site at Friendship Park. And we have one big goal for FD '96: HAVE FUN!

This is your invitation to come and "play Field Day" with the rest of the W6TRW gang. If you're a down and dirty contester, you can come out, fight the pileups and make a ton of contacts. If you take a more casual approach, bring your lawn chair, sunscreen and cooler. The club is throwing a weekend-long party any you're invited! There's something for everyone.

In order to make the most of the weekend, we are looking for:

Band Captains, Station Builders, Equipment Suppliers, Cooks, CW Operators, Phone Operators, VHF/UHF Experts, Emergency Power Folks, Traffic Handlers, Media People, Satellite Experts, Packet Radio Gurus, Loggers, Helpers, Novices, Technicians, Generals, Advancers, Extras and Folks Who Don't Even Have a License!

If you're interested in helping out with Field Day '96, let us know. Or better still, come to one of the following meetings. All help is appreciated.

No one will be turned away. And you'll have fun!

Day Time Field Day Planning Meetings: Every Wednesday at Noon in the S Cafeteria

TRW/ARC Club Meetings: Cathy's Deli, 5:30 PM
Tuesday, June 11th

To Volunteer, call:

Bob Briggs, KD6WYQ, at (310) 813-2622
-or-
Rich Sauer, N6CIZ, at (310) 813-5869

Proposed BONUS points and AWARDS for your next FIELD DAY ADVENTURE:

25 points per antenna or power connection that had to be kluged because there were no mating connectors on hand. 100 point bonus if ALL connections made without using clip leads or solder. An extra 50 points per 250' roll of duck tape used.

500 points for getting a signal on the air without using any duck tape at all.

50 points for installing a PL-259 while dangling from the mast, at least 15-feet above the ground. Extra bonus of 25 points for remembering to install the sleeve before soldering. Additional 5 points if the sleeve was placed in the proper direction.

50 points if 3 or more beam elements lie in the same plane with no greater than 10-degrees deviation. An extra 150 points if the plane is within 10-degrees of horizontal.

50 points for each successful re-raising of the antenna if task was completed within 30-minutes of its falling.

100 points per square inch of bandage material used to treat cuts and abrasions incurred while erecting the antenna or trying to position the generator. (You may substitute 500 points per stitch -- whichever is greater)

Lack of Culinary Adventure Penalty: deduct 20 points per can of Dinty Moore beef stew eaten. Cancel penalty if eaten cold.

Ben Franklin Bonus: 10 points per contact made during a severe thunderstorm. Additional bonus of 2 points per contact made under a collapsed tent. Additional bonus of 2 points per contact if tent interior is flooded with more than 3-inches of water.

Add 10 points per dollar value of damage caused to any transmitting or receiving apparatus that was known to be working at the onset of the Field Day weekend.

10 points per inhaled moth or fly, while speaking into the microphone. 5 points per stuffed mosquito, squashed on log; must submit log.

25 points for receiving a "59" signal report from a station who had to ask you to repeat your "check" over 10-times. (Or giving a "36" signal report to a station known to be running an automated contest exchange system.)

The "Yeah, Right" Bonus: add 100 points for each 20-meter net control operator who appears on your frequency -- and, who, after listening to your plea, apologizes and politely agrees to let you continue.

200 points for each pileup you generate and immediately abandon by switching bands or turning the microphone over to an inexperienced beginner.

2,000 bonus points for not working California, Florida or Western PA.

50 point bonus for not even hearing W1VT throughout the contest period.

1 point per volt of RF energy on the microphone housing - or 10 points per lip blister. 50 points if entire moustache is burned off.

Penalty of 50 points if the campfire was prematurely started by a falling end of the inverted-Vee that arced through the starter gasoline. 50 point bonus if this was done intentionally because no one remembered to bring matches.

Saturday evening campfire scoring: Skewer marshmallow and approach fire, remaining 24" above ground. When marshmallow melts or burst into flame, record distance (in feet) to edge of fire. Multiply this figure by 100.

10 points per antenna insulator manufactured from melted glass pop-bottles, thrown in the campfire.

250 bonus points for working someone who asks, "what's Field Day?" and taking the time to answer him.

10 points for each successful tent set-up that was accomplished by using plastic tent stakes, exclusively.

100 points for bodily providing the electrical return path to ground for the generator.

SPECIAL AWARDS:

Conservation of Resources Award: for the cost-saving practice of using a 100-foot, 14/3 extension cord for the 2-kW linear.

Joe Cool Award: for non-chalantly asking W1AW to repeat its call phonetically...and then asking several times for a repeat of its Section.

Special-Friend Award: a certificate of achievement for creative engineering -- earned for attaching the output of the linear to the RX input of your best friend's IC-781.

E. Kneivel Award: for filling the generator gas tank without bothering to shut it off first.

Good Faith Award: for powering the logging computer and the linear from the same quad-box.

Maxwell Award: for packing the log disks on top of the power-supply/speaker cabinet of the FT-757 for the trip home from Field Day.

Iron Ear Award: for spending 90-minutes or more attempting to raise someone on 160-meters.

Adm. R.E. Byrd Award: for running an exhaust hose from the generator to keep the operating tent warm during the early morning hours.

Diplomacy Award: for patiently explaining the difference to the 125th visitor who asks, "oh... isn't that sort of like C.B?"

Diplomacy Award-II: for deftly fielding the question, "I have a cousin who lives in Madagascar -- could I talk to her now?"

Poker Face Award: for respectfully declining the offer from the visitor who pulls up in a huge Kenworth, complete with four, shiny, stainless steel, 9-foot whip antennas, and says, "If ya'll want to run some REAL power, you can borrow mah linear..."

-73- Andy. KE0UL @ KE0UL.#NECO.CO.USA.NOAM

# Building S Shack Update

Chris, WA2KDL and Max, NU6U report that the JPS ANC-4 noise canceller is working good. Dave Nelson has been coordinating work on the building S antennas. The KT-34XA beam needs a major refurbishment before it goes up. If you enjoy antenna work or would like to learn more about HF antennas please volunteer to help Dave (x39775). The following is Dave's summary of activities:

We measured the tower sections at about 48' total. The roof is about 32' above ground. A 5' mast above the tower would place the KLM at about 85' over ground, and will provide low takeoff angles. We would like to place the Cushcraft WARC (12 and 17m) yagi over the KLM. KLM suggested an 8' separation, so the WARC antenna would be at 93'. Note: Cushcraft offers a 30m dipole add-on to the 12/17 yagi, which I recommend purchasing. That will give us 30 thru 10 over the rotator. Computed takeoff angles for the lowest elevation gain maxima for these heights are:

| | |
|---|---|
| 30m | 15 deg |
| 20 | 12.7 |
| 17 | 8.4 |
| 15 | 8.4 |
| 12 | 6.1 |
| 10 | 6.4 |

This is beginning to sound like a respectable contest setup. The Cushcraft WARC beam is in excellent condition.

It had been noted that the AV-5 (no WARC) vertical is not optimally tuned. Yes the TS-940 tuner matches things up OK, but we made some measurements as a routine check. Bill (KJ6GR) brought his MFJ analyzer and we made checks in the shack. The antenna connection is sealed and we didn't want to open it. The ladder on the roof was a bit short and it would have been a stretch to reach it easily also. (But I'm thankful we had a ladder -- thanks Ray). Some variations in the VSWR were noticed, attributed to wind as we measured the following resonant frequencies and corresponding VSWR.

| | |
|---|---|
| 3.95 MHz | 3:1 |
| 7.15 | 2.8: 1 |
| 13.9 | 2.8:1 |
| 20.7 | 2.3:1 |
| 27.6 | 2:1 |

It is mounted on the 12' high steel roof fence which provides a counterpoise. Cushcraft offers a radial kit for this antenna. No radials are used on bldg. S.

After Bill and Steve left, I had more time to try the TS-940 with the AV-5. Erratic VSWR indications were noticed. I connected the Autech Research WM1 meter to compare with the -940. Both showed the same erracticity, but with some difference in VSWR. The indications were bi-valued, suggesting a loose connection. Large changes occurred on 80, 40, and 20. 15 and 10 showed very little change. Must be a bad trap. The antenna should not be used on 80, 40, or 20 until repaired. I have the recorded measurements in my notebook.

It's possible the AV-5 may need to be moved to clear the tower and guys. We didn't know where the guy anchors will be located. But the AV-5 should b kept on bldg. S to provide vertical polarization, omni pattern alternatives. Also very handy if the rotator fails, and it makes an excellent noise pickup antenna for the ANC-4 noise canceller. If moved, it may need radials installed.

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**Wanted:** CROSSTALK Editor, no experience necessary. Call Bob Briggs at (310) 813-2622 to volunteer.

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**For Sale:** Yaesu FT-1000D, IRC slow tuning board, 600 Hz filter in sub-Rcvr, SP-5 matching speaker. $2500. Bill KJ6GR (310) 542-9899 after 6 p.m.

**For Sale:** RF Concepts 70 cm. 10/100 watt power amplifier with preamp. $250. Bill, KJ6GR (310) 542-9899 after 6 p.m.

# Homebrew VHF/UHF Antennas

by Bill Shanney, KJ6GR

VHF/UHF antennas are reasonably small and can be constructed with readily available materials. The list of references at the end of this article contain numerous designs and construction techniques. I highly recommend building one of these proven performers to gain experience prior to attempting your own design.

Building an antenna using store bought materials will usually cost more than buying a commercially manufactured model. The OEM buys materials in large quantities at a much lower price than local hardware suppliers sell at. One way to save money is to salvage parts from old TV or ham antennas At these higher frequencies wire/tubing diameter and other metallic construction details affect performance. For example, changing the elements of a 450 MHz 3 element yagi from .055 inch wire to 1/4" tubing is illustrated in Figure 1. Antenna modeling programs are helpful in predicting performance changes due to mechanical modifications[1].

Dimensional tolerances get very small at UHF. Table 1 summarizes the effect of length change on a half wave element that is used in a Yagi design. Most 2 meter designs are 2-4 MHz wide while typical 70 cm designs have 10-20 MHz bandwidth. Length control on the order of 1/32 inch should be adequate for simple broadband designs for these bands. This also tells you how much to trim the element if the antenna is off frequency. I always trim in smaller steps than required to avoid excess overshoot. Multi-element designs are difficult to trim since the lengths not only affect center frequency, but gain and front-to-back ratio as well.

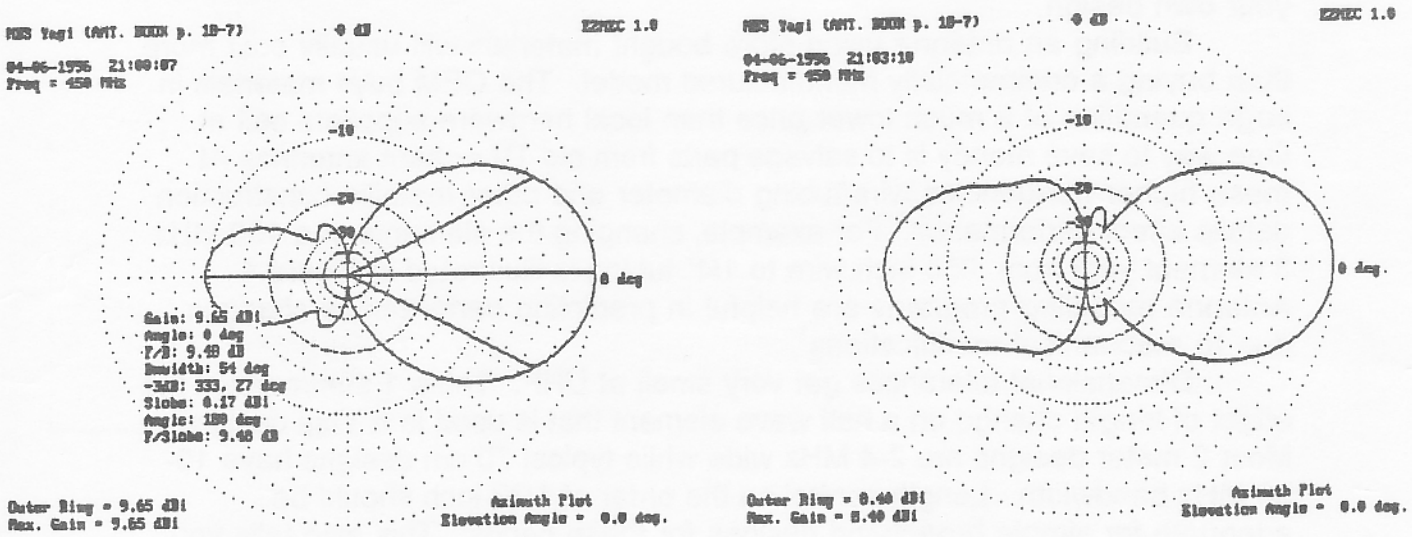
Table 1. The effect of legnth change on center frequency for VHF/UHF halfwave antennas

| Band | Half-wavelength* in free space | Sensitivity to length change |
|---|---|---|
| 2m (145 MHz) | 40.7 in. | 0.28 in./MHz |
| 70 cm | 13.1 in. | 0.28 in./10 MHz |
| 23 cm (1290 MHz) | 4.58 in. | 0.072 in./20 MHz |

*Actual resonant lengths will be slightly shorter due to end fringing capacitance

[1] MININEC and NEC software versions are readily available for the PC. K6STI's Antenna Optimizer (AO) and W7EL's ELNEC or EZNEC are all excellent analysis programs. Yagi designs, very popular at VHF/UHF, are easily optimized using K6STI's Yagi Optimizer (YO). I've used and highly recommend these fine products.

One final thought that is often overlooked, a commercial model is a good starting point to optimize a design to suit your requirements using Yagi analysis/optimizer software. The commercial antenna can be modified easily by drilling a few holes and trimming and/or replacing a few elements. This way you get the performance you want and the commercial price advantage. If the radiation resistance is significantly different from the original design, the matching network may also require redesign.




a) .055" element diameter

b) .250" element diameter

Figure 1. 3 Element 450 MHz Yagi in Free Space

Sources of VHF/UHF antenna designs

- The ARRL Antenna Book (any edition)
- All About VHF Amateur Radio by William Orr, W6SAI
- VHF/UHF Manual by G.R. Jessop, G6JP (RSGB)
- The ARRL UHF/Microwave Experimenter's Manual
- The ARRL Handbook for Radio Amateurs (any recent edition)

# W6TRW Calendar

## June 1996:

| | | |
|---|---|---|
| Tuesday, June 4 | 5:30 pm | **Executive Board Meeting**<br>O1/1210 (All Club Members are invited) |
| Tuesday, June 11 | 12:00 noon | **Emergency Communications Team Meeting**<br>R3 Emergency Operations Center |
| Tuesday, June 11 | 5:30 pm | **Club Meeting**<br>Cathy's Deli, 1828 Manhattan Bch Blvd<br>(next to Tomboy's) |
| Friday, June 21 | 12:00 noon | **Technical Chairman's Meeting**<br>Building S Hamshack |
| Saturday, June 22<br>Sunday, June 23 | all day | FIELD DAY |
| Tuesday, June 25 | 12:00 noon | **Emergency Communications Team Meeting**<br>R3 Emergency Operations Center |
| Saturday, June 29 | 7:00 am | **TRW/ARC Swap Meet**<br>Marine and Aviation (Northeast Corner) |
| Saturday, June 29 | 12:00 noon | **T-Hunt**<br>Swap Meet Parking Lot - 144.72 MHz |

## July 1996:

| | | |
|---|---|---|
| Tuesday, July 2 | 5:30 pm | **Executive Board Meeting**<br>O1/1210 (All Club Members are invited) |
| Tuesday, July 9 | 12:00 noon | **Emergency Communications Team Meeting**<br>R3 Emergency Operations Center |
| Tuesday, July 9 | 5:30 pm | **Club Meeting**<br>Cathy's Deli, 1828 Manhattan Bch Blvd<br>(next to Tomboy's) |
| Friday, July 19 | 12:00 noon | **Technical Chairman's Meeting**<br>Building S Hamshack |
| Tuesday, July 23 | 12:00 noon | **Emergency Communications Team Meeting**<br>R3 Emergency Operations Center |
| Saturday, July 27 | 7:00 am | **TRW/ARC Swap Meet**<br>Marine and Aviation (Northeast Corner) |
| Saturday, July 27 | 12:00 noon | **T-Hunt**<br>Swap Meet Parking Lot - 144.72 MHz |

## Reoccurring Events:

| | | |
|---|---|---|
| Every Monday Night<br>(Except the 1st & Holidays) | 7:30 pm | **Disaster Communication Systems (DCS) Net**<br>DCS Members: Check in on 2 Meter Repeater |
| Every Thursday Night | 6:30 pm | **TRW Amateur Radio Club Net**<br>The Bob and ? Show - Check In on 2 Meter Repeater |
| Every Friday Morning | 7:30 am | **TRW Amateur Radio Club Breakfast**<br>Building S Cafeteria - Everyone is invited<br>Talk-in on 2 Meters |