TARC TRANSMITTER

TULSA AMATEUR RADIO CLUB, INC. NEWSLETTER © June 1994

SPECIAL SERVICE CLUB — ARRL

BE THERE OR BE SQUARE !

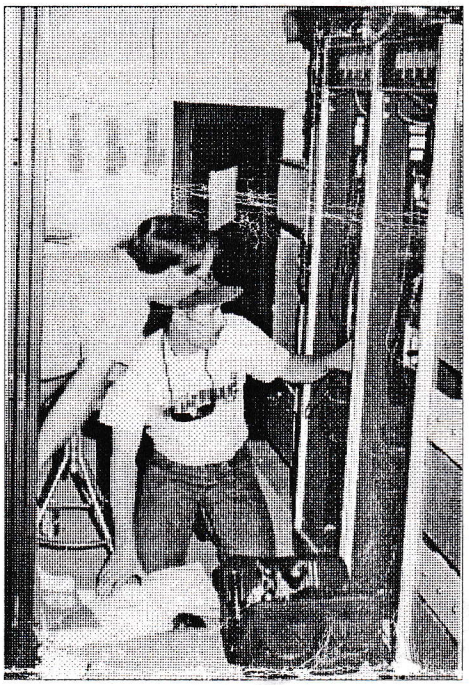
FIELD DAY is upon us once again! From 1:00 PM CDT, June 25th to 1:00 PM on June 26th will be the largest generation of radio waves this country has ever seen as hams across the continent try to contact each other on equipment of all types and sizes. Our field day will be at it's traditional location the Keystone Lake Overlook, South of the dam.

As always, any amateur or non-amateur may participate. We will be operating under W5OK and will have an Extra Class control operator. So whether you're a novice, general or a no-code tech with your license in FCC limbo, slather on that insect repellant and come join fun.

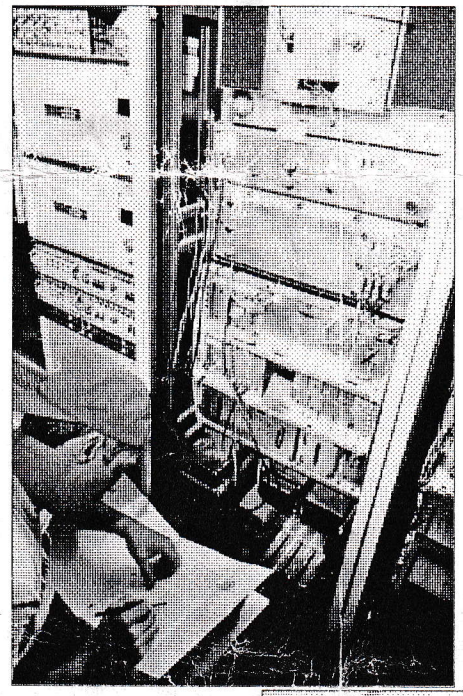
The trailer and generator have been given the once over by Tim Diehl, KB5ZVC and Tom Roinen, KB5HMZ. Again, we feel that running a 6A station will give us better ratings in the ARRL standings. This year we will once again be able to run novice, two meter and packet stations with no penalty to the number of radios being used. There will be a total of ten stations running.

Our goal, as always, is to score more points than last year. Charlie Calhoun, KB5ZUD has time sheets for everyone who would like to schedule themselves for this event. We don't want to loose the fun aspect of Field Day, but we do want to fill in the holes we experience every year during the wee hours of the morning.

Some of our more adventurous members may want to come out and dare to experience HF at 3:00 AM. So get in touch with Charlie, your friendly neighborhood VP, and volunteer for a few hours at the dial!



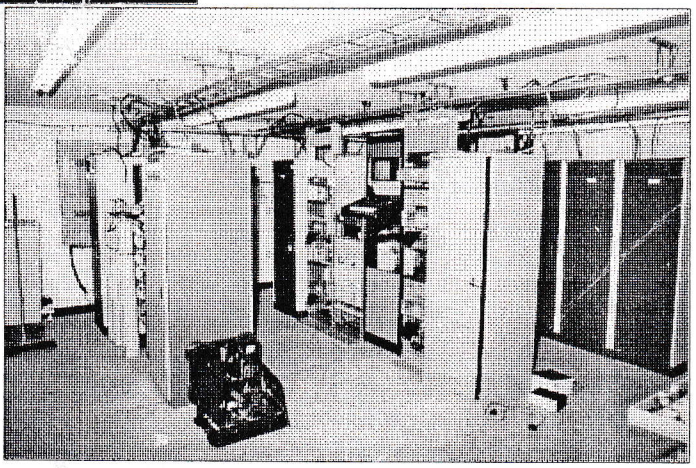
The Repeater Squad,(Tim Diehl, KB5ZVC & Jerry Moyer, N5FEK) tunes up the new 440 repeater. ↓ →



443.75 Premiers

Thanks to Jerry Moyers, N5FEK, the TARC has a monster UHF machine on the East side of town. Signal reports from South of Caney, Kansas to Rose, Oklahoma and as far West as the outskirts of Oklahoma City, prove this machine to be fantastic. As soon as the club can afford a second phone bill we will have an autopatch on it. The repeater has a Micro Computer Concepts RC1000A controller and bears the call sign N5FEK.

One Mean Machine!



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Let's Make A Deal...

SELL: Ham IV Rotor & Controller - Recond. $150, MFJ901B Antenna Tuner 400 Watt PEP $65, Palomar 300 Watt Amp $250, Tempo1 10-80 M AM,CW,SSB Mint & owner manual D104 Astatic desk micr $300, 6 meter 5 in 20 out amp $50 Call Bill, KB5WQV @ 358-3687

SELL: Alinco DJ180T, NEW (won at hamfest) $180, Monochrome VGA $60 Green or amber TTL monochrome $45 each. Call Vince, N5RFW @ 446-6451

SELL: MFJ-207 HF-SWR meter, Call Steve, N5VJH @ 241-2469

SELL: HEATHKIT COLLECTORS "TWO'R" HW29A Mint $100.00 OBO "SIXER" HW30 Mint $100.00 OBO Call Jim, KB5CWP @ 742-2024

SELL: Pair of C-64 CW Interfaces, AEA CP-1 Gap Vertical 6 Call Tom, KB5HMZ @ 227-1140

SELL: Atlas 210X, slide in bracket & power supply, TEN-TEC 2510B Mode B satellite radio. Call Hank, WA5JRH @ (405) 722-0640

SELL: Yaesu FT 470, several battery packs, earphone/head mike, lapel mike, wall charger, soft cases, 2 antennas, Call: Tom N5KBG @ 355-4140.

SELL: Heath 401 Transmitter and 301 Receiver. Call: Dave, N5XQJ - Bartlesville @ (1) 333-9400 10AM-4PM

SELL: Cushcraft R5, HF vertical LN. $225.00 Call: Carl, W5NLB @ 627-8998

SELL: Collins KW-2 Amp supply , round emblem, Ham IV, light duty tower. Call Dale Bramer, WB2ZUG @ 341-5527

SELL: Cushcraft R5 Vertical $180.00 Call: Curtis, N5WIT @ 587-0526

SELL: Drake T4X & R4B Twins w/ matching power supply also talk about selling a Kenwood TS520 Call: Gary, WB9VOM @ 665-8447

WANT: 2 meter amplifier 5 in 30 out Call Jason, N5ZZY @ 743-5320

SELL: Alinco DJ-580T: HT-2m, 440MHZ: standard charger, battery: soft case, remote control speaker mic, HT stand, Micronta regulated 12 volt power supply. All cables included. 1 year old. Sell as a complete set only. $325 Call Graham,KB5BZR/AA (918) 299-4189

Sell: 2 IBM 8088 Packet computers. Both 640K memory with 1 360K drive & hard drive, one 30 meg, one 21 meg. Comes with CGA monitor Charlie Calhoun, KB5ZUD 749-6584

MEETING

This months meeting will be at Keplinger Hall, T.U. Campus on June 14. This months program is being coordinated by Charlie Calhoun, KB5ZUD and as of this date the exact topic remains a mystery. The door prizes for this month's meeting are: •MFJ-260B 300W Dry Dummy Load 0-150MHz; • Pico J 146/435 roll up pocket size J antenna; •1-1994/95 ARRL Repeater Directory; • 2 copies of the Wirebook II

Club Hub Bub

Help us recognize our own members. If you have information regarding awards or upgrades please call. Jack Long, KC5ADR, to advanced; Lynn Morgan (WB5IQS's XYL), no-code tech pending; Jim Seaton, N5YDH, to advanced; Mary Whitney (KJ5OM's XYL), no-code tech pending; and Billy Lamb, N5XJU, TO general. *WAY TO GO!!!!!!!!!*

SWAP MEETS

Broken Arrow Swap Meet
2nd & 4th Saturday @ 8:00 AM, Presbyterian Church at 12th and College in Broken Arrow

SA-*TRO*-DAY Meet 3rd Saturday @ 8:00 AM, PSO (covered) lot at 7th & Frankfort in Tulsa

Simulated Emergency Test

The Salvation Army in conjunction with Civil Defense will be participating in a simulated emergency test on June 18th at approximately noon. Tulsa Amateur Radio Club as well as any amateur in the area has been asked to participate. There are no details at this time. As well there may not be.

'Hamlet' at the Hamfest

Once again Hamfest has come and gone. Last year I sat at home and wondered what all the excitement was about. All the hams that I knew spent the days preceeding the 'Fest running around in circles and bouncing off the walls. What I had envisioned of Hamfest was something akin to a garage sale. (I hate garage sales.) I just knew that it was a dark dusty room containing tables covered with the rejects of the amateur radio world. Boy was I wrong!

Keep in mind that I am just a Baby Ham, a 'Hamlet' if you will, but I was impressed. As I helped with the preparations I began to see that it was much more than I thought.

The morning of the event arrived and as I aproached the registration counter I saw hundreds of people! All of the hams that I had the pleasure of visiting with were wonderful. The forums were well planned and informative as well as entertaining. And the flea market was a blast. I knew nothing about any of the stuff I was looking at or any of the things I was looking for so I enlisted the help of Jack Long, KC5ADR, and Charlie Calhoun, KB5ZUD. Between the two of them I ended up with a nice antenna for my car that I can connect to my 2 meter hand held now and can also use on a dual band later.

I'm told the banquet was outstanding and Dr. Godwin's program was all it was promised to be and more. All the people on the committees and all the volunteers involved deserve a pat on the back for a job exceptionally well done. I'm already looking forward to next year. Maybe by then I'll know what I'm looking for.

Cathy Meek, call sign MIA

FYI

Cathy Meek has assumed the role of assistant editor and put 95% of this newsletter together. I want to say thank you to her for her help. N5RFW

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HAM RADIO STATION PROTECTION

Proper lightning protection for a ham radio station can involve more variables than any other type of radio site. The following table shows many of the major combinations available. The bottom line is the antenna location will establish the grounding requirements, while the station location will drive the protection requirements.The primary rule for surviving a lightning strike is still the same no matter which of the many possible variations you have: all equipment elements must be connected to a single, low impedance ground system. This includes the antenna, the antenna support (pole, tower, etc.), and all of your station's inputs and outputs (1/O's-. antenna, power, telephone, rotor, etc.).

SHACK LOCATION	ANTENNA SUPPORT	POWER/TELCO ENTRANCE	
Basement	Ground Mnt. (verticla)	Opposite Side	Under-ground
1st Floor	Tower / Pole (Conductive)	Near Side	Aerial
2nd Floor	Wood Pole/Tree		
High Rise	Roof Mounted		

Let's examine the significant elements of a good grounding and protection scheme to help you construct a "bullet proof" installation that will survive a direct lightning strike.

We will begin with the antenna. The type and placement of the antenna will dictate the location and size of your ground system. All antenna systems must be grounded. This is accomplished by grounding the base of the tower. For wood pole mounted antennas, connect the antenna mast to the ground system using copper strap. The antenna ground system must be able to dissipate as much of the energy as soon as possible to prevent it from traveling to your equipment. As we will see later on, the ground system is formed by a set of ground rods interconnected below grade with bare radials.

Also fundamental to a good protection scheme is the creation of a single point ground within the ham shack. This single point ground is used to mount all of the protectors and to provide a ground for all of the equipment chassis. This interior single point ground is connected to an external ground system (also composed of radials with ground rods) with a low impedance copper strap. The tower ground system and the single point ground system must be interconnected. This interconnection should be below grade and with a bare low inductance conductor. Your coax shield must not be the only interconnection between these ground systems.

Three Techniques

Every free standing conductor has measurable inductance. Similarly, ground conductors exhibit normal inductance before they go below grade. Once in the ground, the inductance of a bare conductor is shunted by the earth's conductivity.

If the soil at the grounding location is not very conductive, three things can be done to help the situation. First, increase the surface area of the conductor which will decrease its normal inductance. Second, dope the soil to increase its conductivity and thus shunt the inductance of the in-ground bare conductors. Third, install additional bare radial lines with ground rods which will effectively parallel the inductance and reduce the overall system inductance. In some locations it may be necessary to utilze all three of these techniques for the best results. Let's examine each one.

Conductor Surface Area

The most effective material for a ground system conductor is copper strap. Copper as a metal is a good electrical conductor, only moderately attacked by ground and air borne acids, and should have a life-span measured in years. Since lightning has a large portion of its energy in the VHF range, it will behave like an RF signal. That means the energy will only be conducted on the skin of a conductor (skin effect). Thus, the surge current will only ride on the outermost surface of the conductor. Such currents following a round-member conductor will not make extensive use of its large cross sectional area. With a 1-1/2 inch or larger flat strap of at least 26 gauge (0.0159 inches), both surfaces will conduct the surge.

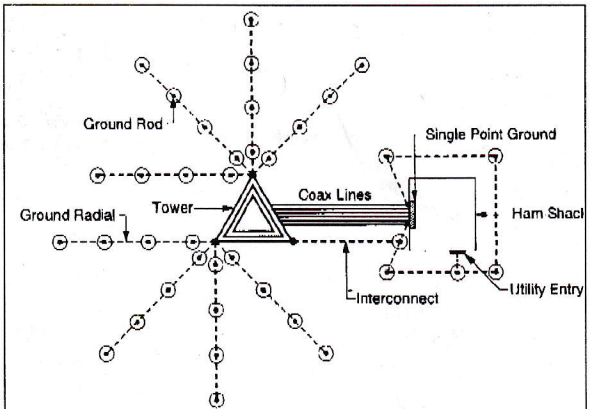
Soil Doping

Water in its purest form is an insulator. Ionic salts when mixed with water make ions. The ea0h is a conductor because of the number of ionic salts present in the soil. Therefore, conductivity can be improved by adding more ions to the soil. Soil doping can be done by either adding water or a saline solution to the soil around the grounding system. If the soil already has a sufficient amount of naturally occurring salts, adding water will free the ions and improve conductivity. The more ions (salts) available, the less water that will be needed to reach a given level of conductivity.

If few natural ions are available, salts, such as Epsom salts, can be added to the soil to increase the conductivity. Depending on the amount of rainfall, doping the ground system radials with 4 pounds of salt per linear foot and 20 pounds per rod may last approximately two years.

Ground Radials

Radials are the most cost effective grounding technique considering system impedance, material cost, and installation labor. If one #6AWG bare radial gives "X" resistance, then two will deliver an equivalent "parallel rule" plus 10%. This rule only holds true when the soil has the same conductivity over the entire radial area. After the first two radials, you will need to double the



Typical tower ground system interconnected with a ham shack single point ground system.

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number of radials each time to continue with the parallel plus rule.

Radials do have a limit on their effective length. If the surge energy has not been launched into the soil within the first 75 feet, the inductance of the radial will prevent any further effective prorogation. Therefore, as a general rule of thumb, all radials should be at least 50 feet long and no longer than 75 feet.

Ground rods should be placed along the entire length of each radial. The most cost effective spacing between rods for normal (grassy) soil is two times the length of a rod into the ground, If 8 toot rods are used, they should be placed on 16 foot centers.

If the soil is not normal (e.g., very dry or sandy), the separation may be reduced in order to minimize the interconnect inductance. It doesn't hurt to have the rods too close, it only costs more in material and labor.

. . . to be continued

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Ham Calendar

June 1994

9 Bat Net 10:00PM

TARC Net 9:00PM

10 BAT Net 10:00PM
Tulsa Amateur Radio School

11 Salvation Army/ARES Net 8:00AM

BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM
VE Testing Cntr Phy Handicp 9:30AM

12 AA Net 9:00PM

14 TARC Meeting 7:00PM

ARES/RACES Net - 9:00

16 Bat Net 10:00PM

TARC Net 9:00PM

VE Testing - Air Park 6:30 PM

17 BAT Net 10:00PM
Tulsa Amateur Radio School

18 BAT Net 10:00PM
Owasso Net 9:00PM
Sat-TRO-day SwapMeet, T-Hunt 8AM

19 AA Net 9:00PM

21 ARES/RACES Net - Tim 9:00PM

23 Bat Net 10:00PM

TARC Net 9:00PM

24 BAT Net 10:00PM
Tulsa Amateur Radio School

Field Day Setup

25 BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM
AA ARC - Meeting & Testing

Field Day

26 AA Net 9:00PM

Field Day

28 TRO Meeting 7:30PM
ARES/RACES Net- 9:00PM

30 Bat Net 10:00PM

TARC Net 9:00PM

July 1994

1 BAT Net 10:00PM
Tulsa Amateur Radio School

2 BAT Net 10:00PM
Owasso Net 9:00PM

TARC BREAKFAST - 8:30 AM

3 AA Net 9:00PM
BA ARC - Meeting

5 ARES/RACES NET - 9:00PM

7 Bat Net 10:00PM

TARC Net 9:00PM

8 BAT Net 10:00PM

9 BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM
VE Testing Cntr Phy Handicp 9:30AM

10 AA Net 9:00PM

12 TARC Meeting 7:00PM

ARES/RACES Net - 9:00

14 Bat Net 10:00PM

TARC Net 9:00PM

15 BAT Net 10:00PM

16 BAT Net 10:00PM
Owasso Net 9:00PM
Sat-TRO-day SwapMeet, T-Hunt 8AM

17 AA Net 9:00PM

18 Simulated Emergency- 1:00PM Salvation Army

19 ARES/RACES Net - 9:00PM

21 Bat Net 10:00PM

TARC Net 9:00PM

VE Testing -Air Park VoTech 6:30 PM

22 BAT Net 10:00PM

23 BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM

24 AA Net 9:00PM

26 TRO Meeting 7:30PM
ARES/RACES Net- 9:00PM

28 Bat Net 10:00PM

TARC Net 9:00PM

29 BAT Net 10:00PM

30 BAT Net 10:00PM
Owasso Net 9:00PM
AA ARC - Meeting & Testing

31 AA Net 9:00PM

August 1994

BA ARC - Meeting

2 ARES/RACES NET - 9:00PM

4 Bat Net 10:00PM

TARC Net 9:00PM

5 BAT Net 10:00PM

6 BAT Net 10:00PM
Owasso Net 9:00PM

TARC BREAKFAST - 8:30 AM

7 AA Net 9:00PM

9 TARC Meeting 7:00PM

ARES/RACES Net - 9:00

11 Bat Net 10:00PM

TARC Net 9:00PM

12 BAT Net 10:00PM

13 BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM
VE Testing Cntr Phy Handicp 9:30AM

14 AA Net 9:00PM

16 ARES/RACES Net - 9:00PM

18 Bat Net 10:00PM

TARC Net 9:00PM

VE Testing - Air Park VoTech 6:30 PM

19 BAT Net 10:00PM

20 BAT Net 10:00PM
Owasso Net 9:00PM
Sat-TRO-day SwapMeet, T-Hunt 8AM

21 AA Net 9:00PM

23 TRO Meeting 7:30PM
ARES/RACES Net- 9:00PM

25 Bat Net 10:00PM

TARC Net 9:00PM

26 BAT Net 10:00PM

27 BAT Net 10:00PM
Owasso Net 9:00PM
BA Swap Meet 8:00AM
AA ARC - Meeting & Testing

28 AA Net 9:00PM

30 ARES/RACES Net - 9:00 PM

September 1994

1 Bat Net 10:00PM

TARC Net 9:00PM

2 BAT Net 10:00PM

3 BAT Net 10:00PM
Owasso Net 9:00PM
TARC BREAKFAST - 8:30 AM

4 AA Net 9:00PM
BA ARC - Meeting

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Simulated Emergencies

There are two different simulated emergency events comming up. The first is by the Salvation Army on June 18th at 1:00PM and the second is by the Creek County group on August 30th. Emergency service is a large part of what amateur radio is about so please plan to participate.

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TARC OFFICERS

President, Richard Morgan, WB5IQS
1st Vice President, Charlie Calhoun, KB5ZUD
2nd V Pres., Lou Wilcoxson, N5TXA
Secretary, Pat Lane, K5QOP
Treasurer, Tim Aman, KB5OGH
Trustee, Tim Diehl, KB5ZVC
Public Service Liasion Officer, Vince Moore, N5RFW

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