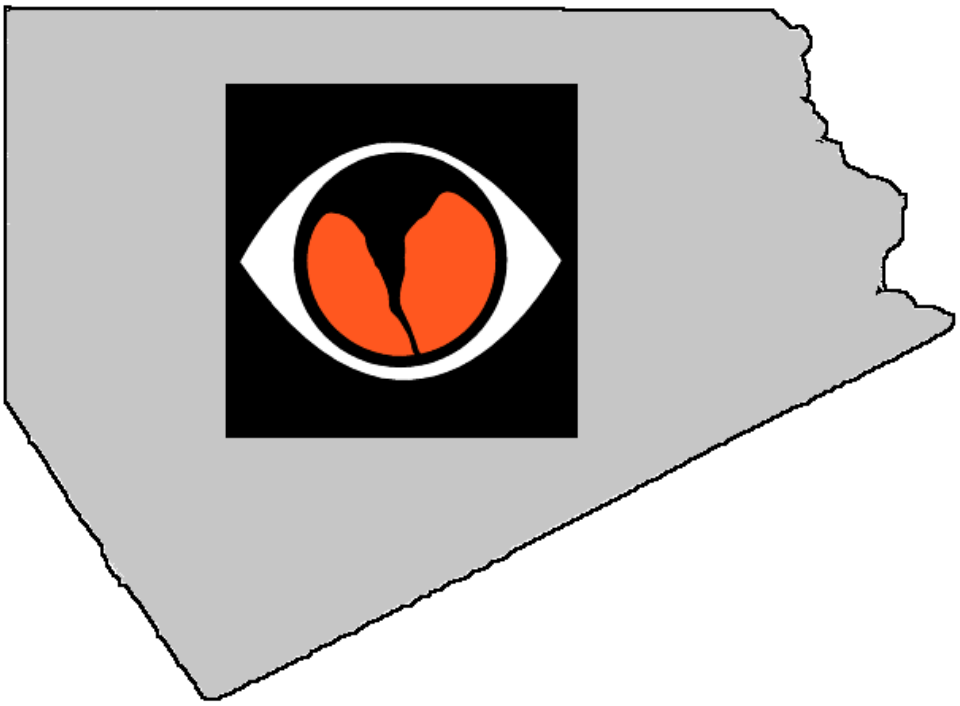
Ellis County RACES



Reference Manual

2008

TABLE OF CONTENTS

What is the Radio Amateur Civil Emergency Service?

RACES is an organization of licensed amateur radio operators who volunteer their time and equipment to provide supplemental communication to local, county and state governments in time of an emergency or natural disaster. Its operation is governed by FCC regulations found in PART 92, Subpart E. A major function performed by RACES in the Ellis County area is providing information to the National Weather Service during periods of threatening or severe weather. Countywide RACES nets are authorized by the Federal Communications Commission per part 97, Subpart E, and the City of Waxahachie-Ellis County Office of Emergency Management.

Who can participate?

By FCC regulations only certified appointees may participate in RACES operations – including training sessions. At the National Weather Service's request, only RACES appointees who have attended a SKYWARN school within the past two years can make weather reports during SKYWARN nets. Any licensed amateur radio operator with two-meter operating privileges may apply through the RACES Radio Officer to be certified. Each appointee is issued an identification badge containing the appointee's name, call sign, RACES unit number, and photograph. This identification is only to be displayed during official RACES operations including training, drills, and activations. **Use for any other purpose may be grounds for revocation.**

What is expected?

RACES appointees are expected to have a sincere interest in providing communications as a public service to amateur radio. Each appointee should be equipped to operate on the designated RACES frequencies. Because storm spotting is a major function of RACES in this area, each RACES storm spotter must attend *National Weather Service (NWS) "SKYWARN"* training at least once every two years. This training is presented throughout the area during the early spring and at Ham-Com in June. The Ellis County course is typically offered in the month of March. SKYWARN storm spotter training sessions usually last between two and four hours. On-the-air training sessions are regularly scheduled for Ellis County at 7:30pm the first Thursday of every month on 145.410.

Training Nets

Although each RACES organization is independent, all require some level of training and participation to maintain appointment. Hams who wish to obtain a RACES appointment but have situations that prevent full participation should contact their RACES Radio Officer.

RACES Application

RACES applications may be obtained by contacting the RACES Radio Officer or by filling out and mailing an application form found at http://www.wd5ddh.org/races/races_app.pdf.

RACES Appointees Basic Requirements

1. Demonstrate a willingness to prepare for and participate in emergency communication events.
2. Willing to equip one's self with knowledge, skills, and equipment to meet basic mission requirements.
3. Possess a valid Amateur Radio Operator's License for two-meter operation.
4. Own a two-meter FM transceiver appropriate for RACES operations.
5. Live in or be able to respond to activations in Ellis County.
6. Be approved by the County RACES authority.

Annual Renewal Requirements

1. Continue to meet BASIC requirements.
2. Participate in a minimum of eight (8) RACES training or actual activation nets within Ellis County.

SKYWARN Net Participation Requirements

1. Currently active and authorized by the RACES organization in Ellis County.
2. Attend National Weather Service certified SKYWARN training within the last twenty-four (24) months. The National Weather Service has requested that only SKYWARN trained appointees make weather reports during SKYWARN Nets. While the minimum requirement is one session every two (2) years, it is strongly recommended that appointees attend annual training to enhance their understanding of storm structure and safety. The opportunity to see slides, videos, and diagrams of recent severe storms, tornados and "look a-likes" will enhance the spotter's effectiveness in the field. New RACES appointees are encouraged to check in to several training nets and monitor at least one SKYWARN Net before participating in order to develop a familiarity with the procedures used and the message content. The formats for the various types of reports are contained in this manual along with examples of the actual message content.

RACES/ARES Net Participation Requirements

1. Meet SKYWARN Net requirements.
2. Participate as a communicator in at least one (1) Public Service Event, minimum two (2) hour duration, or participate in an alternate activity approved by your RACES Radio Officer. Additional PSE's will count toward two (2) net check-ins.
3. Complete FEMA IS-100 Introduction to Incident Command System.
4. Complete FEMA IS-700 National Incident Management System.

Ellis County Area Net Frequencies

145.150 - Sachse RACES Primary
145.270 - Kaufman County RACES (alternate) (CTCSS 136.5 Hz)
145.290 - Navarro County RACES
145.310 - Mesquite RACES (CTCSS 162.2 Hz)
145.390 - Wise County RACES
146.400 S Sachse RACES Simplex
145.410 - Ellis County RACES (CTCSS 110.9)
145.490 - Johnson County RACES (CTCSS 88.5 Hz)
146.580 S Dallas County RACES (Simplex)
146.660 - Garland RACES
146.720 - Irving RACES
146.740 - Collin County ARES – North (CTCSS 110.9 Hz)
146.780 - Hill County RACES (CTCSS 123.0 Hz)
146.880 - Dallas City & County RACES (Primary)
(No tone required, transmits 114.8 Hz during RACES Nets)
146.920 - Denton County RACES (CTCSS 110.9 Hz)
146.940 - Tarrant County RACES (CTCSS 110.9 Hz)
146.960 - Dallas City & County RACES (Secondary)
146.980 - Wise County RACES
147.120 + Richardson RACES
147.140 + Arlington (Tarrant County)
147.180 + Collin County ARES – South (CTCSS 107.2 Hz)
147.240 + Garland RACES
147.280 + Kaufman Conty RACES (Primary) (CTCSS 136.5 Hz)
147.540 S Garland RACES (Simplex)
147.580 S Rowlett RACES (Simplex)
147.555 S Rockwall County ARES (Simplex)
441.525 + Rockwall County ARES (CTCSS 141.3 Hz)
444.225 + Coppell/Carrollton RACES
442.075 + Dallas County REACT (CTCSS 110.9 Hz)
(linked to 146.880 during RACES Nets)

Simplified Emergency Report Format

To assist in emergency situations the following reporting format has been developed that follows the letters of the word **HAND**.

H – **Have** – What type of emergency do you **Have**? Is it a fire, accident with injury, medical emergency?

A – **At** – You are **At** *location*? An address or distance and direction from the nearest major intersection.

N – **Need** – What assistance do you **Need**? Fire and Rescue, Police Officer, or Ambulance?

D – **Details** – What **Details** will help responders? Details are those things that responders need to know before arriving on the scene. For instance: there is a fire; a fuel or chemical spill; are there fumes; are there multiple victims; are there other hazards for which they need to prepare? If there is a Hazardous Material Placard on a vehicle involved in an accident, the numbers tell the responders the nature of the material involved. **Do not approach vehicles that display Hazardous Material Placards**. If the placard cannot be seen from your location, do not approach the vehicle and stay up wind if possible. Just tell the dispatcher that there is a Hazardous Material Placard.

Remember to keep your transmissions brief to give dispatchers and responders an opportunity to ask vital questions.

Estimating Rainfall Rates

Reports of estimated rainfall rates and wind provide important insight regarding the location of severe storm cells. This aids forecasters in issuing Watches and Warnings to communities that are located in the path of the storm. The following charts should help estimate rainfall and wind speed. The key word, however, is *estimate*. Exact numbers are less important than consistency in reporting.

Rainfall Rates	Category
.5" to 1" per hour	Heavy Guideline: 1" per hour/Heavy rainfall makes it difficult to see beyond 75' to 100' (approximately 5 standard-sized car lengths) with any definition
1" to 2" per hour	Very Heavy
2" to 5" per hour	Intense
>5" per hour	Extreme Guideline: Extreme rainfall rates restrict visibility to 20' or less with any definition.

Note: Do not attempt to estimate rainfall from a moving vehicle. Rain beating on the windshield can be misleading.

Estimating Wind Speeds

Miles per Hour	Observation
25 to 31	Large branches move; Whistling in high lines
32 to 48	Whole trees in motion
39 to 46	Twigs break off trees; Progress while walking is impeded
47 to 54	Slight structural damage
55 to 63	Trees uprooted; Considerable structural damage (seldom seen inland)
64 to 75	Widespread damage (rarely experienced)

Estimating Hail Sizes

Report Size	Common Object Size
.25"	Pea
.75"	Penny
1.00"	Quarters
1.25"	Half-dollar
1.75"	Golf ball
2.50"	Tennis ball
2.75"	Baseball
4.00"	Grapefruit

SKYWARN Net Protocol

RACES units making reports on the net follow a two step identification procedure. The first step is to identify yourself and establish that you are an authorized RACES appointee.
The second step identifies your location to assist the Net Control Stations (NCS), the National Weather Service, and any Emergency Operations Centers (EOCs) that are monitoring the net.

1. **Enter the net by transmitting your full callsign using standard phonetics, followed by your RACES unit number and adding "mobile" if appropriate.**
Numbers are to be given individually, 5-5 instead of fifty-five.
Examples: KD5VQN, RACES unit 55, who is mobile identifies as, "Kilo Delta Five Victor Quebec November, five five, mobile."

2. **When recognized by NCS, begin your report with your callsign, MAPSCO grid and/or designated spotter location number.**

3. **End your report with your full FCC assigned callsign.**
Although you are not required to ID after every comment made during report exchanges, you must use your full FCC callsign during the last transmission of your report.

Standard SKYWARN Weather Condition Report

Call sign – Unit number – Mapsco – Rain – Wind – Hail

It is very helpful if information is transmitted in a consistent manner. Whenever possible, present storm report information in the following order:

1. **Mapsco grid**
2. **Rainfall rate** in inches-per-hour, state whether it is measured or estimated
3. **Wind speed** and the direction it is coming from, state whether measured or estimated
4. **Hail size** in fractions of an inch and intensity (light, moderate, heavy)

Example: "Kilo Delta Five Victor Quebec November, five five, Mapsco 1-0-3-2, rain estimated 3" per hour, winds from the South at 30 miles per hour measured, moderate 1/2" hail. KD5VQN"

Entering the net with a weather priority

Weather priorities are those items requiring immediate attention, such as a lowering, funnel, or wall cloud. Enter the net using the pro-sign "Break, Break" followed by your call sign, un-key and await recognition by NCS.
Example: Spotter: "BREAK, BREAK, KD5VQN", NCS: "ALL STATIONS STANDBY, KD5VQN", Spotter: "KD5VQN, Mapsco 1-0-3-2. I have a wall cloud with rotation 5 miles southwest of me, moving to the northeast. KD5VQN", NCS: "ALL STATIONS STANDBY. We have a report of a wall cloud southwest of Mapsco 1032. Are there any stations that can confirm?"

Minimum Reporting Criteria

The following list shows the priorities in which weather events should be reported, necessary reporting details, and minimum criteria for reporting.

All weather reports stand by when a funnel, wall cloud, or flashes not associated with lightning are being reported and tracked.

1. Funnel
- a. Is *surface damage* occurring?
- b. Is funnel *visible halfway* to ground?
- c. What is your *Mapsco* grid?
- d. *Direction* and *distance* from you to funnel?
- e. *Direction* and *rate of travel* of funnel?

2. Wall Cloud
- a. Is *sustained rotation* visible in the cloud?
- b. Is *surface damage* occurring?
- c. Where is the *updraft* located on the wall cloud?
- d. What is your *Mapsco* grid?
- e. *Direction* and *distance* from you to wall cloud?
- f. *Direction* and *rate of travel* of wall cloud?

3. Flashes of light at ground level, not associated with lightning strike
- a. Are there *multiple flashes* or a *continuous line of flashes*?
- b. What is your *Mapsco* grid?
- c. *Direction* and *distance* from you to flashes?

4. Hail larger than 1/4 inch
- a. What is your *Mapsco* grid?
- b. *Size of the hail* in inches?
- c. How much is falling? (intermittent, light, moderate, heavy, biblical)

5. Damaging Winds (over 50 MPH)
- a. What is your *Mapsco* grid?
- b. Is the wind speed *greater than 50 MPH*? (*cannot* walk against the wind)
- c. What direction is the wind *coming from*?
- d. *Briefly describe damage* that is occurring

6. Flash Flooding

a. Is water *flowing across* the road?

i. Is there a *current*?

ii. Curb deep water does *not meet minimum reporting* criteria!

b. Is rising water a *threat to life or property*?

c. Are *children playing in culverts or flood waters*?

7. Rain over 1" per hour

a. Is visibility restricted to *less than five car lengths*?

b. What is your *Mapsco* grid?

c. What is the estimated or measured rainfall rate in inches per hour?

REMEMBER OUR MISSION

To locate possible threats to life and property and provide information from which warnings can be issued!

SKYWARN Pre-Net Checklist

- Do I have *immediate* access to my SKYWARN kit?
- Can I immediately go mobile to track severe weather providing information to the SKYWARN net regarding my location and the direction of travel of severe weather?
- Does my storm spotting location have *at least two exits* in *different directions*?
- Can I give useful directions/Mapsco coordinates?
- Can I identify myself to officials as a RACES member? How?
- Can I identify myself to officials as an Amateur Radio Operator?
- Can I identify my present location by *major Mapsco* grid?
- What will I eat and drink, and how will I stay physically comfortable?
- How will I power my portable unit without utility power?

SKYWARN Severe weather reported checklist

- *What is my present location*?
- Where is the severe weather in relation to my present location?
- What direction is the severe weather moving and how fast?
- *Am I in the path of the severe weather*?
- If I am in the path, what action should I take?
- If I am not in the path, can I provide any additional useful and important information?

NEXRAD Information

There are three weather surveillance radar systems that service the National Weather Service Forth Worth Forecasting Office. The Ft. Worth radar installation is at Spinks Air Field in south central Tarrant County. The other two are located at Granger, northeast of Waco, and at Dyess AFB near Abilene. All are WSR-88-D units.

Mesocyclone

The computer associated with the WSR-88-D can identify the location of an apparent circulation based upon persistent rotation at 15 to 25 knots for greater than ten minutes through a depth of at least 10,000 feet. Characteristics discussed on net will relate to its apparent location, how strong it appears and the apparent shear across the mesocyclone. This information will be used to direct spotters' attention to areas more likely to produce wall clouds and lowerings.

NEXRAD Update

The WSR-88-D "NEXRAD" radar performs a series of scans and collects data that is processed and made available at the operators' display screens. The normal time for a complete scan series and the computation of the data takes approximately six minutes. The information is then available for evaluation by the operator or forecaster. Numerous different views of the data are used to examine the storm's structure. However, new data is only available every six minutes.

Tornado Vortex Signature (TVS)

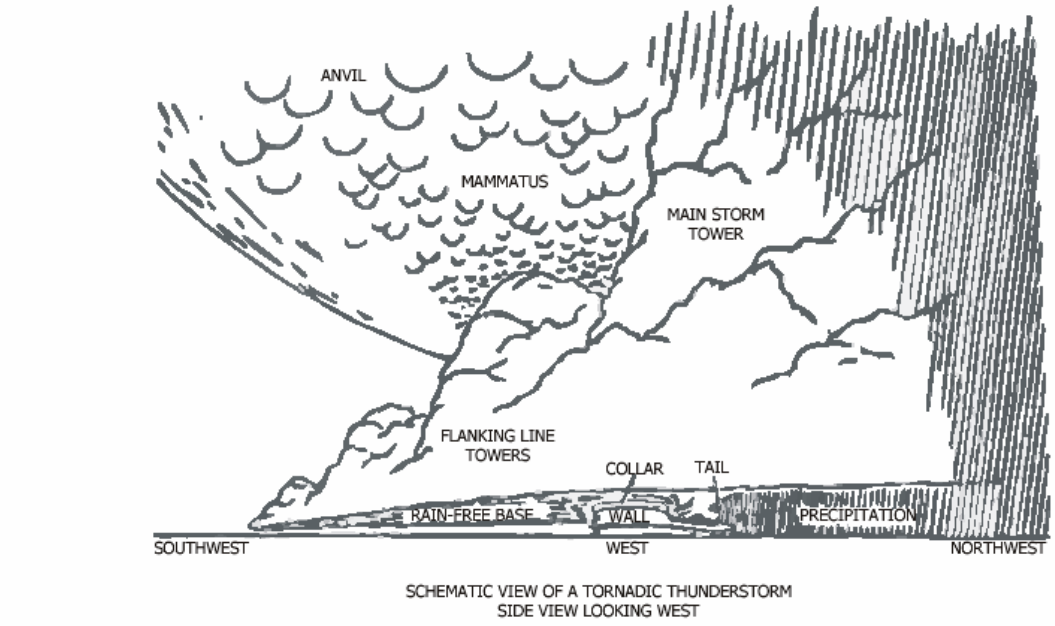
When the computer associated with the WSR-88-D identifies an area within a mesocyclone where severe windshear is occurring, the NEXRAD operator is alerted and a TVS symbol is placed on the display next to the location.

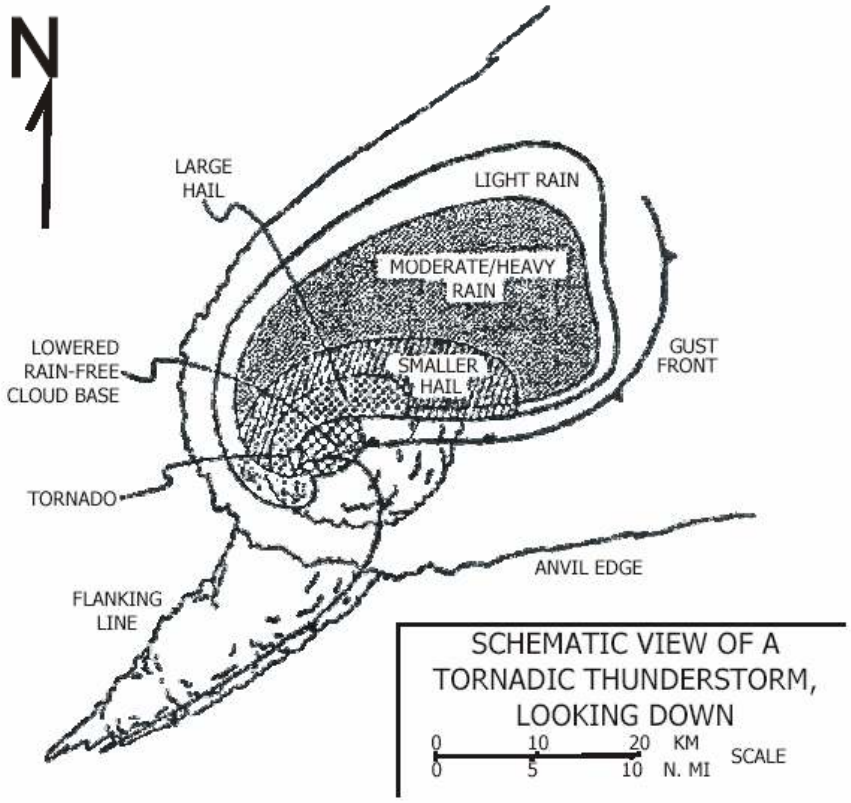
Vertically Integrated Liquid (VIL)

The WSR-88-D calculates the water volume in a cubic centimeter of air based upon the reflectivity of an echo. The maximum VIL of a storm is one indicator of its potential severity, especially the potential maximum hail size. The VIL range is 1 to 70. Due to hail's higher reflectivity, storms with hail show elevated VIL levels. Hail size for a particular VIL level varies with the season. For example, observations of VIL levels that produced .75" hail are listed below:

Jan: 35 VILs	Apr: 50 VILs	Jul: 65 VILs	Oct: 50 VILs
Feb: 40 VILs	May: 55 VILs	Aug: 65 VILs	Nov: 45 VILs
Mar: 45 VILs	Jun: 65 VILs	Sep: 55 VILs	DEC: 40 VILs

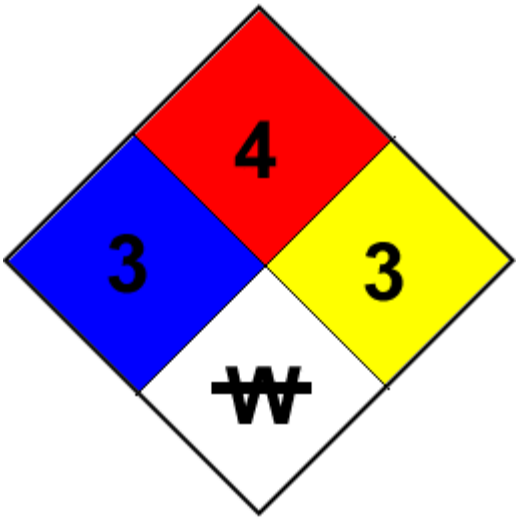
SOURCE: Skip Ely and Jim Stefkovich of the Ft. Worth Forecasting Office of the National Weather Service. January, 15th, 1994.





Schematic Views of Thunderstorms

Hazardous Material Labeling System



You see these signs on any building that contains hazardous chemicals. The sign is called an **NFPA panel**. NFPA stands for National Fire Protection Association.
The idea behind these signs is to give firefighters some sort of advanced notice on what they are getting themselves into when they arrive at the scene of a fire. When there is a house fire, firefighters have a pretty good idea of what they are in for, but if there is a fire at a warehouse in an industrial park, it is very hard to know what chemicals might be stored there. The NFPA panel is a clear indication of what sort of dangers might lie inside.

The panel has four areas:

- **Red** - Fire hazard
- **Blue** - Health hazard
- **Yellow** - Reactivity
- **White** - Specific hazard

In the **Fire hazard** area, the numbers indicate the flash point: • 0 = Will not burn • 1 = Above 200 degrees F (93 C) • 2 = Below 200 degrees F • 3 = Below 100 degrees F (38 C) • 4 = Below 73 degrees F (23)	In the **Reactivity** area: • 0 = Stable • 1 = Unstable if heated • 2 = Violent chemical • 3 = Shock or heat may detonate • 4 = May detonate
In the **Health hazard** area: • 0 = No hazard • 1 = Slightly hazardous • 2 = Hazardous • 3 = Extremely hazardous • 4 = Deadly	In the **Specific hazard** area, you will see things like: • OXY - Oxidizer • ACID • ALK - Alkali • COR - Corrosive

You may also see a "W" with a bar through it (meaning "use no water"), or the radiation hazard symbol for radioactive materials.

RACES Kit for Mobile or Portable Stations

Bold type indicates suggested minimum equipment list

1. **VHF transceiver (25 watt minimum output to antenna for SKYWARN)**
2. **Fuses for radio and auto.**
3. **Mapsco map book for Ellis County.**
4. **RACES identification card.**
5. **Valid Amateur Radio license or photocopy.**
6. **Spare glasses. (If you cannot function without them)**
7. **Medications. (If required during a long activation)**
8. **First Aid kit.**
9. **Compass.**
10. **Flashlight and spare batteries.**
11. **Watch.**
12. **Clipboard with pencil or pen and paper.**
13. **Vehicle's fuel tank full.**
14. **Foul weather gear appropriate for the season.**
15. Portable or handheld radio with extra batteries.
16. RACES hat. (Ball cap with official RACES emblem)
17. Spare antenna. (Magnetic mount preferred)
18. Basic hand tools. (Pliers, screwdrivers, clip leads, etc.)
19. Small amount of cash including some change.
20. Magnetic RACES signs for vehicle.
21. RACES hard hat (White with name on front and callsign on back)
22. Binoculars.
23. City/county maps for areas outside of Mapsco coverage.
24. Rope, chains, flares, etc.
25. Alternate band equipment (UHF/HF).
26. Camera. (Film or digital)
27. ARRL message forms.
28. Canteen or water bottle and food.

RACES Power Connector Standard

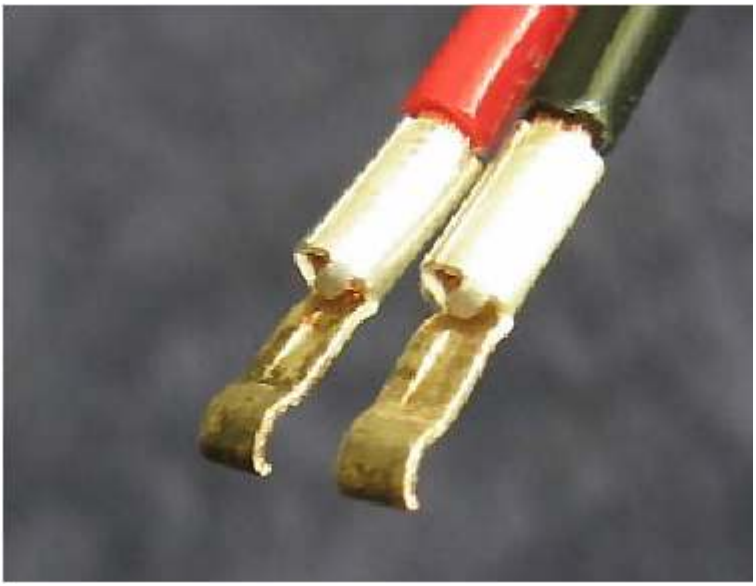
Anderson Powerpole

The Powerpole connector, designed by Anderson Power Products, is becoming increasingly popular with amateur radio operators around the country. Several major ham radio organizations have encouraged the use of these connectors in the theory that if everyone individually adopted this "standard", every operator's radio equipment would interface quickly and easily with one another's power supplies. Since amateur radio may be used in emergency communication situations, this level of portability is necessary to ensure interoperability of equipment.

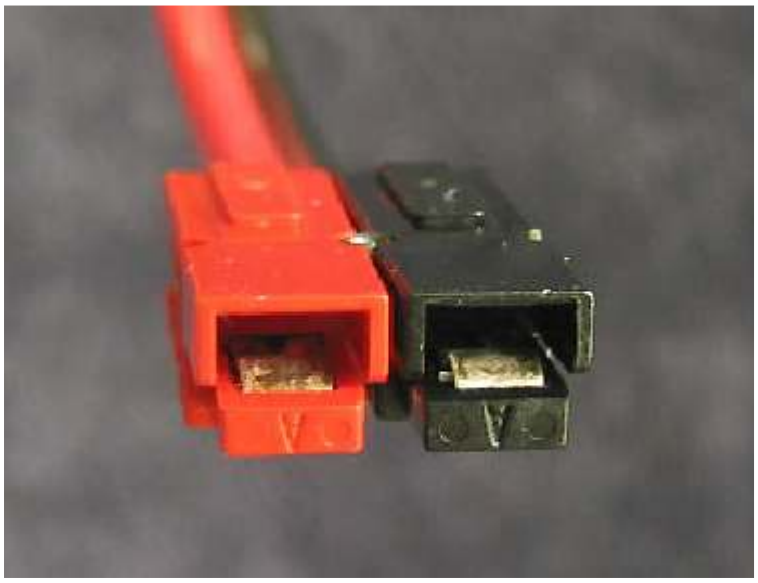
Ellis County RACES supports the use of Anderson Powerpoles. While the PP15, PP30, and PP45 models of the connector are interchangeable, we use the 1330 series, PP30, 30 amp connector.

Powerpole Assembly Instructions

The 30 amp Powerpole connector is designed for use with wire sizes from # 12 to # 16 AWG. While you may use wire smaller than # 16 AWG for low current applications, wire larger than # 12 AWG will not enter the connector properly. Strip 5/16" of insulation from the wire and insert the bare wire into the connector well. Either solder the connector onto the wire or use a crimp tool specifically designed for the Powerpole. If using solder, use it sparingly and avoid getting solder on the connector tab. If you are using molded wire, cut the wire so the positive and negative leads are the same length. Assemble so the ends of the connector tabs are flush with one another and are facing up when the positive wire is on the left, as viewed from the mating connector. Please refer to the following picture.



As viewed from the mating connector, slide the red and black plastic housings together so that the red (positive) connector is on the left and the connector hoods are at the top. Take care to match the red and black housings correctly the first time as it may be very difficult to separate them afterward.
Push the wire connectors firmly into the housing assembly. Each connector will click into position when fully seated. You may find it helpful to use a jewelers screw driver or similar tool to push the connector into it's housing. The final assembly should appear exactly as the one in the following picture.



Powerpoles may be found through the following providers.

Packaged Indus. Power (P.I. Power)
110 Austin
Garland, TX 75040
972-494-6024

Stocks Anderson Powerpole connectors. Inside contact is Anitra. She has the RACES standard
information and understands what you will need. Small quantity orders are OK. Hours are 8 to 4:30 M-F. Located in Mapsco 19A-W.

PowerWerx.com
401 S. Harbor Blvd., F-320, La Habra, CA 90631
Tel: (714) 570-3303
Fax: (714) 990-5532
http://www.powerwerx.com/
info@powerwerx.com

SOURCE: Martin Schneider, K5GMS; pictures and text.

ITU Phonetic Alphabet

A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Fox Trot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

H.A.N.D.

To assist in emergency situations the following reporting format has been developed that follows the letters of the word **HAND**.

H – **Have** – What type of emergency do you **Have**? Is it a fire, accident with injury, medical emergency?

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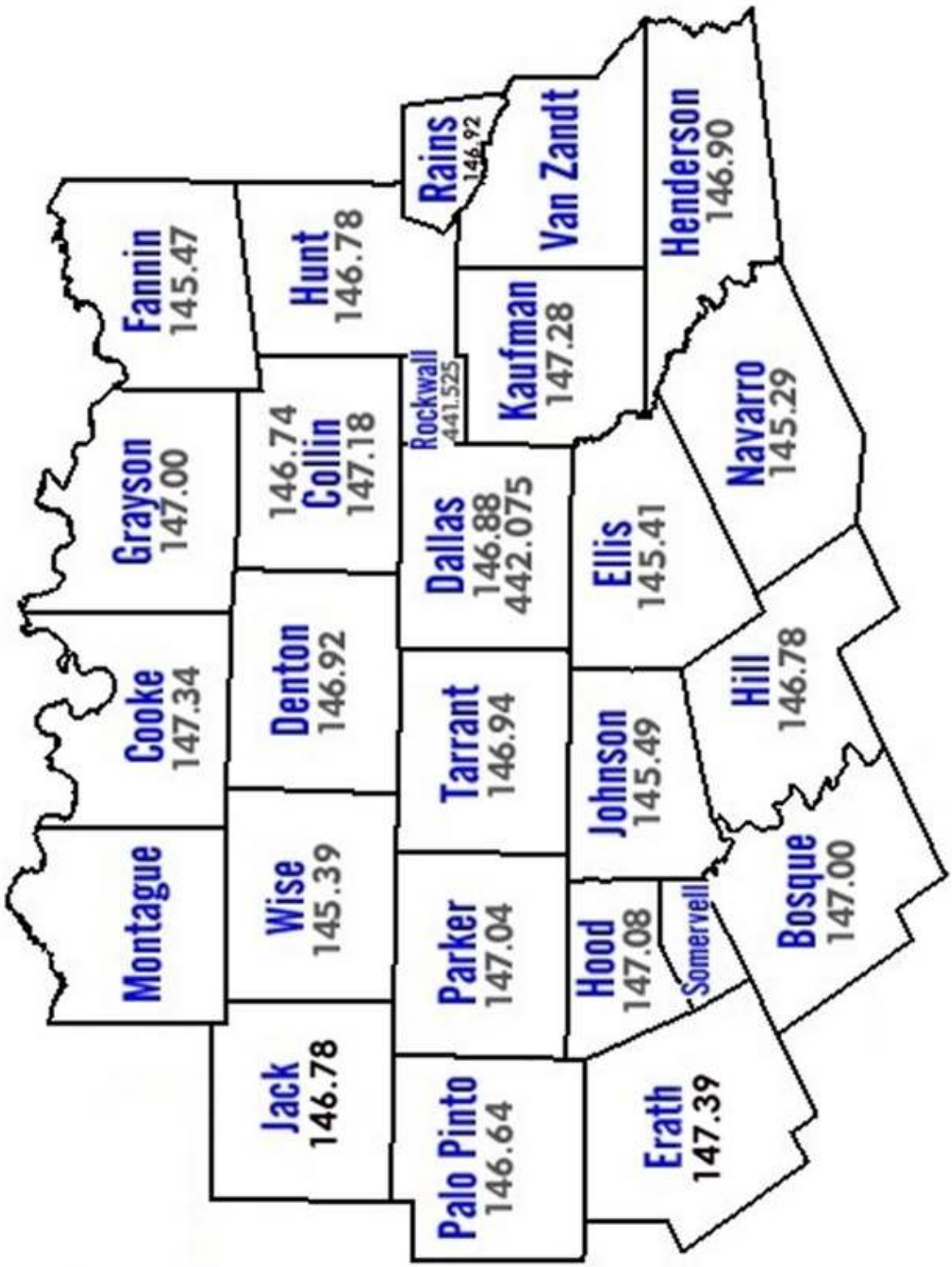
Ellis and Surrounding County SKYWARN Frequencies



Ellis County RACES Spotter Location Maps

The following maps are designed to aid Ellis County R.A.C.E.S. members in pre-positioning for optimal spotting of storms as they approach and threaten our county. The shaded portion of the circle around each location is the optimal viewing angle from that position. These locations serve as starting points when there is enough advance warning for Net Control to safely direct mobile spotters to a particular area of interest. These locations are only starting points, and spotters should move along with the storm until it can be handed off to another spotter as it moves through the county. As always, SAFETY is the number one priority. If possible, mobile spotters should always travel in pairs and leave at least two escape routes from their spotting location. Please download these maps and keep one copy in your vehicle and one at your base station for reference.
(These maps are located at http://www.wd5ddh.org/spotter_maps.htm. Please visit this link to download copies of the maps.)