



# THE BULLSHEET



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Contest Chairman:	K5LZO Chuck Coleman	K5TU Kim Carr
DX Chairman:	KC5CP Mike Davidson	Columns by: K2TNO, N5JJ, KC5CP, K5LZO

## ANNOUNCEMENTS

MEETING NOTICE - The Texas DX Society meets the second Friday of each month except when changed by the Board of Directors. The December TDXS meeting will be held Friday, December 13th, at the Bellaire Hospital Professional Building, 6550 Mapleridge at 7:30 p.m.

CONGRATULATIONS - to the 1986 members of the TDXS Board of Directors for their election/appointment to the following offices:

President -	W5ASP	Joe Staples
V-President -	N5JJ	David Busick
Secretary -	KE5IV	Ken Grabenstein
Treasurer -	KC5M	Frank Wyatt
Contest Chairman -	KN5H	Steve Nace
DX Chairman -	WA9VLI	Steve Smothers
Repeater Chairman -	K5TU	Kim Carr
Communications Chairman -	K2TNO	Bill Schrader
Legal Chairman -	KE5FI	Chuck Dietz
Field Day Chairman -	W5SJS	Bob Burns

TEN METER CONTEST - Don't forget the Ten Meter Contest coming up this weekend, December 14-15. This is a contest during which you can work the guys in the club and give them points. Work each station once on each mode. Score 2 points for phone QSOs, 4 for CW and 8 for QSOs with novices. Multipliers are states plus DC plus VE call areas plus DXCC countries (except US and Canada). The official rules say there is no change from last year, but note that DC was not a separate multiplier last year. Propagation seems to be favorable to W5 at this point in the sunspot cycle, so this year may be your best chance to place nationally. It would be great if TDXS members could take top spots on each mode.

BULLSHEET MAILING LIST - It is the club's desire to provide the Bullsheet free to all amateurs in the area with an interest in DXing and/or contesting. If you would like to receive our newsletter, simply send your name, call, and mailing address to the Texas DX Society, P.O. Box 540291, Houston, Texas, 77254-0291. Visitors at the regular club meeting can request the monthly newsletter by providing their mailing address on the sign-in sheet. Articles or other newsworthy items from club members and other interested amateurs are hereby solicited by your editor.

WEEKLY DX & CONTEST NET - Just a reminder that each Tuesday night at 9:00 p.m. the Club sponsors a net on 147.96/.36. Participation by non-members as well as members is welcomed. The purpose of the net is to facilitate the exchange of DX, contest, and Club information within the amateur community. Your active support of this activity is encouraged.

#### THE PRESIDENT'S CORNER (de K2TN0)

I am pleased to announce this is my last month as Prez. Gone are the heady glory days of prestige, respect and adulation heaped upon me by the multitudes. No longer will I rate the the best corner table at Jack-in-the-Box. It is sort of sad to think that 'LZO won't any longer let me have his frequency in the SS. But that is the price of leadership-and I'm glad to have had the chance to oversee the troops.

I'd like to take this oppurtunity to review the past year and to thank you for all your help.

Contests: Let's see, under this year's performance we have such wonderful successes as placing second in Field Day. Or, put another way, losing to some crowd in New Jersey, wherever that is. In CQWW we all got waxed by N5AU, then we turned right around and got the hell beat out of us in Sweepstakes. What a record!

DXing: the 'spots continued their decline, an event some clubbies tried to blame on Yours Truly. Honest, folks, on my last trip to the sun I tried to talk old Sol into adding a few more zits, I really did! My only consolation is in knowing that W5ASP will render the solar surface even more bland and uneventful.

Repeater: I was happy to fix the machine so perfectly and quickly. No doubt you've all been impressed by the performance of the new repeater, which has yet to fail. Of course it's never been on the air either, but that's not my fault, is it? Oh, yeah - guess I do recall something about me building some gimcrack for it way back in the Spring.

Operating: Another banner performance! During the past year, KZ5M, NA5R, K5IY and K5VWV all went either QRT or at best QRX! The only blemishes on this distinguished record were continued aluminum sprouts at NR5M and the lumberyard. Come back, guys!

Membership: At last, a serious plus - we inducted serceral new members, and have our hooks into some additional hot prospects. It looks like this catagory is the only one on the credit side of the ledger.

So, there you have it - put down in black and white, it doesn't seem too impressive a year, does it? But look on the bright side: despite rotten

condidtions, falling beams, stations dismantled and QSO's missed, we all had a lot of fun playing radio in '85. And that, folks, is what it is all about.

73, Bill K2TNO

CONTEST CORRAL (de K5LZO)

CONTEST RUMORS

ARRL SS CW

K5WA	90-57	K5GB	525-72
K2TNO	921-74	NR5M	410-69
K5DX	570-71	KG5U	527-72
K5GN	1120-74	NM5M	847-73
N5JJ	1166-74	KN5H	495-74
K5LZO	1149-74	W5ASP	835-74
N5DU	1101-74	AK5B	650-74
KC5CP	315-74	N5EA	469-73
KB5FU	450-74		

TOPS AROUND COUNTRY

K6LL	1191-74	W5WMU (K5GA)	1170-74
K4VX	1180-74	K5GO	1141-74
W3LPL	1100-74	WA7NIN	1131-74
N6RO	1101-74		

ARRL SS PHONE

N5DU	1752-74	K5RVK	1200-73
NR5M	1715-74	KE5IV	960-73
K5DX	780-74	K5LZO	1580-74
KC5CP	900-74	K5GB	980-72
KE5FI	1300-74		

TOPS AROUND COUNTRY

K4VX	1814-74	N2IC/O	1845-74
N6BV	1868-74	AA5B	1874-74
WA7NIN	1902-74	K6NA	1907-74
N5AU	1805-74		

FROM THE TRENCHES (AND UNDER) (de K5LZO)

CQ WW was most interesting this year. TDXS had some members in Mexico and one in Venezuela. I should have been anywhere else but where I was (at home).

The first 30 hours were great. Kim K5TU had worked 390 JA's on 40 Friday night and Saturday morning. We had good Europe on 40 Friday night and on 20 and 15 Saturday morning. Som JA's on 15 Saturday evening.

I hit the sack about 10 P.M. Saturday with plans of getting up at 3:00 A.M. to relieve Brent NT5D and Bob AK5B. About 1:30 A.M. my wife, Barbara, WB5RUS woke me up to tell me the house was "ON FIRE." This turned out to be a transformer on the Mercury vapor light that burned up and the smoke had drifted into the attic.

Three o'clock came around and I got up and staggered into the radio room. Kim got up about the same time and Kenny NZ5I was already up. I stoked up the large coffee pot and sat down on 40 meters. Kim was on 80 and Kenny was on 20. At 2 AM it had started raining as a front was blowing thru. At 4 o'clock we started getting a small amount of lightning and lots of rain. By 5:20 Kenny had to go to the low 20 because of rain static on the high 20. At 5:30 the lightning bolt hit the front director on the tall 20 meter beam blowing the element off into the yard, scaring the horse, and causing it (the horse, not the beam...ed.) to run through the nearest fence. A large ball of fire quickly developed behind both 20 and 80 meter stations. All within microseconds we grabbed our head phones and threw them off. Of course by then it would have been too late, but it seemed like the thing to do at the time.

A quick check of operators showed us all in good shape. (Anyone who knows Kenny will understand why it would take more than a mere lightning strike to get his attention...ed.) Next thing that came to mind was the equipment. The TS930 on 20 was off, but so was all the equipment on the circuit on that side of the wall. We reset the breaker and the TS430 still did not light up. We found that it had been shelled, along with the TS930 that was on 160. The 160 sloper was on the 20 tower. Also we found the TS700 2M FM rig to be kaput. During the following hour we decided not to get on because of the lightning threat. We found the following equipment shot: 2 CK-2 keyers, a Telrex rotator, an HDR 300 rotator, a TR1930 all mode 2 meter rig, 3 Ham-M control boxes, 2 Ham-M rotators, a complete satellite TV system, 2 Commodore Disk drives, the heating system in the house (which turned out to be only a safety door switch), and I'm not sure but I believe the 6th cylinder on my old Chevy van.

I hope all the above will be covered by insurance. But I doubt if I still will have an insurance company after they settle the claim.

In conclusion I believe we learned a lesson about what is and is not important in a contest. It is a difficult decision to shut the station down, but after that experience we will do just that next time.

73 Chuck  
K5 Lightning Zaps Operators

DX REPORT (de KC5CP)

CONGO - TN8EE - Roger has been on Snookey's Net on 14183 at 1900Z.

IRAN - EP2EMA - Ali has worked several East German stations on 21255 at 1400Z.

CRETE - SV9PR - Eddy reported on 14186 at 1400Z.

MALAGASY REPUBLIC - 5R8AL - Alain and WA4VDE, his manager, meet on Friday on 21330 at 1600Z. On Saturday and Sunday check 7045 or 3505 at 0230-330Z.

CHRISTMAS ISLAND - VK9XI, XJ, XZ. - Check 14028, 14181, 21028, and 28590 daily.

GABON - TR8APQ & AHO have been on the W7PHO Family Hour on 14227 at 2000Z.

LESOTHO - W6QL & W6KG/7P8 - Iris and Lloyd should now be in Lesotho signing portable. CW and SSB on 15-40. (Any 10 mtr. activity please call me.)

SAO TOME - S92LB - Luis is back on 14183 and 2130Z daily. I received his QSL after a 6 week wait but someone had opened the envelope on one end. The card stayed in!

TRISTAN DA CUNHA - ZD9BV - Andy and his manager W4FRU on 21265 at 1500Z daily, but he does not always make the schedule.

KERGUELEN ISLAND - FT8XA on 40 CW 7006-8 at 0045 -0130Z.  
FT8XB on 7078 at 0115Z or 14183 at 2100Z.

ANGOLA - D2BCW was active on 14170 at 2130Z. Hope he has documentation.

S. GRKNEY ISLAND - AZ1A - Mid December to March 1986.

YEMEN - 6W1HA/70 is expected every day and he may have permission. (Since a lot of members need this, please put it out on the repeater and call me and others!)

Propagation by N4XX: High Norm December 4, 5, 8, 9, 13.

73 Mike KC5CP

SQUELCH TALE (de N5JJ)

In and about the club it is rumored that...K2TNO really has guts. After N5DU the "Kenwood Crusher" blew up a 930 and a 940, Bill still loaned Bob a 930 for SS phone. What intestinal fortitude...Some seem to have interesting problems with their cars. KZ5M's BMW goes to bright lights on bumps and N5kW honks with his clutch. Both would be hard on the driver in front of them...Well K5LZO is now known as K5 "Lightning Zaps Operators." Chuck's 20 meter tower took a hit during the CQ CW contest. None of the operators was hurt, but the equipment casualty list includes a TS930 and a TS430 along with antennas, coax, rotors, switches, computers, and home appliances. Should be a lesson to all of us to turn it off when you feel the thunder...Same storm, WA9VLE lost an ICOM 27A to the lightning...I don't believe it, but K5GA is finally engaged with a firm date to Miss Melanie, some time during the 10 meter contest weekend.

Congrats to Mr. Bill. Bill is also coming home to the old neighborhood. VJ Products is moving off of South Post Oak near the loop and Bill and Melanie are house hunting nearby...K5RC is presently moving back to the old Barbizon address...W5SJS' lumber yard is sporting a 5 element 20 at 120' now. Seems to play great...The repeater is currently back up after a week off. K5TU has reworked the old machine once again and reprogrammed the ID'er to now send "K5DX/R TDXS". K5LLL was kind enough to design a state of the art regulator circuit for the supply of 13.59 volts receive to 13.58 volts transmit. Not bad for about 5 amps running through it. K2TNO has finished the control circuitry for the new machine so we may switch over soon. I've heard of a small device assembly, but was Bill really having his daughter Meg wire wrap for him? Anyway, hats off to Bill for getting the circuits together and running. Special thanks to KC5CP for his generosity with a couple of DTMF control boards he won at the Houston show...KE5FI has a pair of new Quads, one a 110' and one at 60'. Chuck should be ready for the 10 meter contest...NM5L has apparently bagged his deer limit this season. After slaying a Buck with his rifle, Bobby took out another with his 280ZX at 70mph. Fortunately Bobby was okay but the car is another story...TDXS had a few expeditions for CQ CW. KN5H, KZ5M, KB5FU, KG5U and N5AF went to XE2 and K5GN went to YV5TK. A fun time was reported by all. Question: How do you travel to Venezeula and not damage your equipment? You borrow an amp from K2TNO, a vertical from N5JJ, and a keyer from K5RC, a supply from NA5R, and a set of filters from N5DC. Thus, your equipment is safe...That's it for now.

73, Dave N5JJ

A HIGH PERFORMANCE VOLTAGE REGULATOR (de K5TU)

The circuit shown in Figure 1 came to me from Ron, K5LLL, after he heard me complaining about the latest repeater power supply problem. This regulator was installed and tested in the repeater, and it works great!

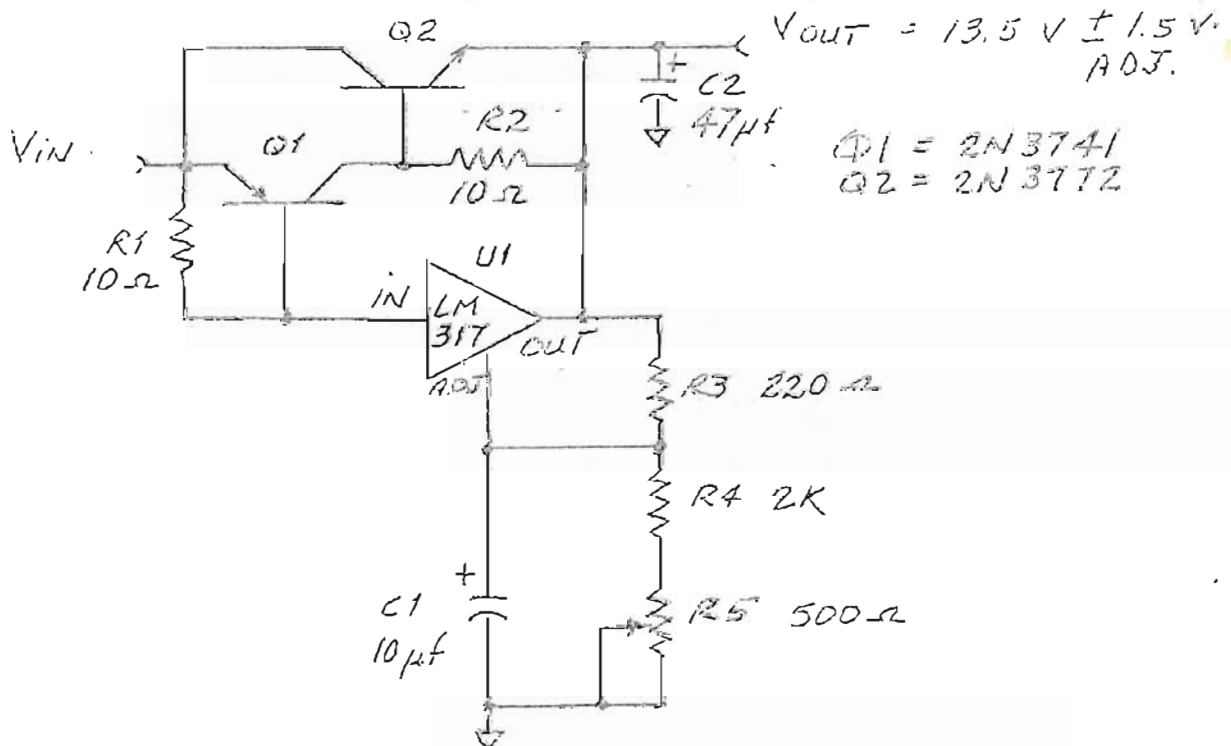


FIG. 1. THE K5LLL Regulator

The heart of the circuit is a National LM317 3 terminal voltage regulator I.C. Specified load regulation is typically 0.1% and the LM317 operates with up to 40V across it (measured input to output).

The circuit uses two transistors as a series pass regulator controlled by the LM317. The output voltage is set by R4 and variable resistor R5. The values shown are for an output of about 13.5 V.D.C. with R5 set at mid range. Adjustment of R5 will span approximately  $\pm 1.5$  V from the nominal 13.5 V setting.

Q1 and Q2 will dissipate some heat, depending on the current and voltage drop across the regulator circuit. Q2 will dissipate most of the heat (90-95%). The remainder will be dissipated in Q1. Size your heatsink accordingly. The LM317 will dissipate very little.

Note that Q1, Q2 and the LM317 must all be insulated from ground. The case of Q2 is the collector; the case should have an insulating cap over it to prevent it from being shorted to ground, particularly if the transistor is mounted on a heat sink external to the cabinet.

Components are not critical. Avoid using an aluminum electrolytic at C2. A tantalum capacitor will provide excellent ripple rejection. All resistors can be 1/4 watt. The LM317 is a commercial grade component. An LM217 or LM117 will also work, but will cost more as they are industrial and military grade parts respectively.

Though not shown, an in-line fuse with an overvoltage crowbar circuit will protect your load from excess voltage. If you need a circuit, contact me.

Minimum load current for this circuit is approximately 60 mA (determined by R1). If you anticipate using the supply with loads less than 60 mA or so put a 180 ohm 2 watt carbon composition resistor across C2. That will set the minimum current above 60 mA.

How well does it work? The circuit I put in the repeater drops only 0.02v as the load varies from 0.2 amps to 5.1 amps. There was no measurable ripple at the output with nearly a volt of ripple on the 22v input. Not bad for \$10.00 worth of parts!

#### Technical Study of the Kenwood TS-940 (de K2TNO)

The following article is a reprint from W2VJN describing the Kenwood TS-940. Note that the noise floor is lower than a '930, but VJN states that the difference would probably not be detectable by ear.

Before you read the results, let's be sure you recall what the numbers mean. December '85 QST has an article about "Product Review" that describes the receiver and transmitter testing. ARRL routinely reports about receivers using only some of the conditions W2VJN has used. The League tests only on 20 meters, and for the blocking and intercept measurements uses a frequency spacing of 20 KHz.

The term "dBm" means decibels referenced to 1 milliwatt. For example, a signal of -10 dBm means a signal that is 10 dB lower than a 1 milliwatt signal.

Since the input impedance of receivers is always 50 ohms these days, you can convert milliwatts to microvolts as follows:

$$\begin{aligned} \text{Power} &= E^2/R \\ 0.001 \text{ watts} &= E^2/50\text{ohms} \\ E^2 &= 0.05 \\ E &= 0.223 \text{ volts r.m.s., or} \\ & 223,000 \text{ microvolts} \end{aligned}$$

The decibel is a logarithmic ratio;

$$\text{dB} = 20 \log \frac{V_1}{V_2}$$

So if we refer an RF voltage to the value shown above, we can calculate the dBm for that signal. First, a 223,000 microvolt signal is "0 dBm" for the following reason:

$$\text{dBm} = 20 \log \frac{(223,000)}{(223,000)} = 20 \log 1$$

But  $\log 1 = 0$ , so  $20 \times 0 = 0$ . Therefore dBm = 0. So a 1 milliwatt signal level is called "0 dBm". If you remember logarithms, you'll recall that the log of a number less than 1 is negative, the log of a number greater than 1 is positive. So signals less than 223,000 microvolts will be expressed as so many "minus dBm", written "-dBm." Signals above 223,000 microvolts will be written as "+dBm."

For example, let's calculate what the dBm would be for an S-9 signal, which on most receivers is 50 microvolts.

$$\begin{aligned} \text{dBm} &= 20 \log \frac{50}{223,000} \\ &= 20 \log 0.000224 \\ &= 20 (-3.65) \\ &= -73 \end{aligned}$$

So, an S-9 signal is -73 dBm.

Now we can prepare a table showing S-units, microvolts and dBm which may help put some of these lab measurements in perspective.

<u>S-units</u>	<u>dBm</u>	<u>Microvolts</u>
1	-121	0.2
3	-109	0.79
5	-97	3.15
7	-85	12.5
9	-73	50*
S9+10 dB	-63	158
+20 dB	-53	499
+40 dB	-33	4989

\*We assume S-9 is 50 microvolts, and that the difference between S-units is 6 dB.



Now look at the TS-940 data on receiver sensitivity. The "noise floor" is the signal strength in dBm that is needed to be 3 dB above the internal receiver noise, i.e., just discernable to your ear. Note that the values are about -135 to -140 dBm. That means you can hear a signal on the '940 that is  $140 - 73 = 67$  dB below S-9.

The blocking value is in many ways the most useful item for DXers and contesters, because it is an index of how well the receiver does at rejecting strong signals away from ones you're tuned to. In the example shown, W2VJN has put a typical weak signal (S-5 on 7 MHz) into the receiver and then simultaneously fed a second, stronger signal in as well. He varied the separation and strength of the second signal, and looked at the strength necessary to degrade reception of the S-5 (desired) signal by 1 dB. Note that when the strong signal was 20 KHz away, its strength had to be +19 dBm to affect the reception. When it was only 5 KHz away, it could be 20 dB weaker (-1 dBm) and have the same effect. If you look at our S-unit table, you'll see that a -1 dBm signal is 72 dB over S-9. This means that the receiver is indeed quite immune to the desensing effects of a strong signal elsewhere on the band.

But what about a signal closer than 5 KHz to your receiver frequency? Aha! If you guess that the trend continues, you're right: the stronger signal can be much weaker the closer it gets, and still have the desensing effect.

What I'd like to see is a more realistic test of receivers for those of us who think S-5 on 40 meters is overwhelmingly loud. We are more concerned with performance of the receiver when the signal is "20 dB below mental telepathy". I'd like to propose a "contest DX index," or CDI, for a receiver:

- 1.) A 0.5 uv signal into a receiver with a 500 Hz bandwidth. (Roughly S-2)
- 2.) Strong signal of 150 uv (roughly 10 dB over S-9).
- 3.) Vary the frequency of the strong signal while keeping its strength constant, and report how close to the listening frequency the strong signal can be before desensing by 1 dB.

Thus the "CDI" would reflect more closely the typical performance you might expect from loud signals on the band, and tell how crowded band conditions will be tolerated by the receiver.

I'll try to test some receivers in this way and report my results in the sheet.

## SUNSPOTS - PART IV - KE5FI

The sun's effect on HF propagation is like a good news - bad news story. We need sunspots to ionize the upper layers of the ionosphere to provide good DX. On the other hand the bad news is, sunspots can also cause ionospheric disturbances with results anywhere from fading to total radio blackouts. "Ionospheric disturbance" is a broad term covering several types of event resulting from the emission of x-rays, charged particles and magnetism from the Sun. This month we will look into the different types of ionospheric disturbances and discuss what actions can be taken to minimize their effects.

### SHORTWAVE FADEOUT

One type of ionospheric disturbance is called the "shortwave fadeout" (SWF). SWFs are the result of x-ray energy emitted from solar flares. These x-rays travel at the speed of light and arrive in the Earth's ionosphere 8.3 minutes after leaving the Sun. They penetrate to the D layer, our lowest ionospheric layer, where they increase the layer's ionization thus increasing its absorption of HF signals passing through to the higher layers. The absorption attenuates signals and may even cause the "band to go dead." SWFs may commence gradually or suddenly in which case they are called, aptly enough, sudden ionospheric disturbances or SIDs.

Since the x-rays travel at the speed of light and arrive with the light rays from the Sun, shortwave fadeouts only occur during daylight and correspond to the visual observation of the flare, if it is visible. Thus a path which passes through darkness will not be affected. Absorption of radio waves increases inversely with the square of the wavelength. This means that absorption is four times less on 40 than 80, sixteen times less on 20 than 80 and sixty-four times less on 10 than 80! Thus the lower bands are more affected by increases in absorption and moving to a higher band may have promise during a SWF.

### POLAR CAP ABSORPTION

Between 1/4 hour and several hours after a flare, slightly slower cosmic ray particles (high energy solar protons) arrive in our ionosphere. Due to the Earth's magnetic field, these particles concentrate at the Earth's poles where they cause polar cap absorption or PCA. As opposed to auroral related absorption which usually lasts only a few hours, PCAs last from one to ten days, and average about three days. Since PCAs are located at the poles, they only absorb signals passing near the poles. Since they are absorption, PCAs affect higher frequencies the least. Thus to counter PCAs move to higher bands and beam paths closer to the equator.

### IONOSPHERIC STORMS

One to three days after a solar flare slower moving (poking along at about 1000 miles per second) protons and electrons arrive in our ionosphere. These charged particles can cause disturbances in the Earth's magnetic field called ionospheric storms if strong enough. "Ionospheric storm" is actually a term for a magnetic disturbance more aptly called a magnetic storm. The particles are once again concentrated at the Earth's poles due to the Earth's magnetic field. Thus, the effects are greatest in the polar regions and extend away from the poles according to the magnitude of the storm.

These magnetic storms last from several hours to several days. WWV K indices will run 4 or higher and the daily A index will be 30 or more. They may have a sudden or gradual commencement and almost always have a gradual recovery. Magnetic storm effects are principally two-fold. First, there is a

lowering of the maximum usable frequency (MUF) due to the effects on the F layer, the highest layer of the ionosphere. The second is the increase in the D layer absorption, which has the practical effect of raising the lowest usable frequency. During stronger magnetic storms the lowest usable frequency may be above the MUF for signal paths passing near the polar regions resulting in no signal getting through at any frequency. Large magnetic storms are frequently accompanied by brilliant auroral displays and are sometimes referred to as "auroral absorption." The effects of magnetic storms occur equally in daylight and darkness. The best counteraction is to go to the highest open band, beam equatorial paths or get some sleep!

#### SPORADIC E

Magnetic storms are a frequent cause of sporadic E propagation. Sporadic E is not a type of ionospheric disturbance per se, however this seems an appropriate place and time to mention it. Sporadic E is the scattering of signals usually in the 10 meter and VHF ranges from ionized "clouds" in the E region of the ionosphere. These clouds many times originate in the east and move toward the west, requiring an agile rotor to peak up signals. When one cloud disappears in the west turn back east for the next. Thus when all else is dead during that big contest do not forget good old ten meters - it may be going strong!

#### HECK WITH THAT - WHAT ABOUT THE TEN METER CONTEST?

First lets look at the prior three years Ten Meter scores:

YEAR	FLUX	A	SCORE	QSOs	MULTs	CALL
1982 *	267.6 *	? *	978,930 *	3285 *	149 *	VE1YX
	259.1 *	? *				
1983 *	111.3 *	22 *	364,686 *	1371 *	133 *	KG1E
	105.0 *	33 *	266,240 *	1040 *	128 *	N5AU
1984 *	76.4 *	09 *	257,894 *	1417 *	91 *	N5AU
	76.8 *	06 *				
1985 *	(78) *	(15) *				
	(78) *	(20) *				

The above scores are the number one phone only scores for each year. I used the phone scores because there were more phone entries than the other modes so they are probably the most representative of conditions. I included N5AU's 1983 score because they had the same operator and presumably substantially the same equipment in 1983 and 1984, thus help us compare conditions for the two years. The forecast flux and A indices appear in parenthesis.

As you can see, the flux is forecast to be slightly higher this year than last. However, the A index of magnetic activity is also forecast to be higher. The higher A index will offset the higher flux so that the multiplier totals this year should be about the same as last. The total QSOs will be about 350 less than last year unless we get another fantastic sporadic E short skip opening like we had on Friday night of last year. However, the daytime rate should be about the same with perhaps more scatter like we had in 1983.

Remember, the A index is difficult to forecast. Listen to WWV - the three hour K index corresponds to the A index as follows:

A:	0	:	3	:	7	:	15	:	27	:	48	:	80	:	140	:	240	:	400	:
K:	0	:	1	:	2	:	3	:	4	:	5	:	6	:	7	:	8	:	9	:

If the K index is 3 or more expect best DX propagation along low latitude paths, especially those which cross the equator. Good luck!