

*Although experience is the best teacher, next best may be someone who has himself just passed the course. The material is still fresh and exciting and the teacher still remembers when the subject was a complete mystery. In the philosophy of "each one teach one," welcome to...*

**"**It's not the shoe you wear, but the runner inside the shoe that counts.

I've lost track of how often my track coach has enlightened me with these words before testing the limits of my legs and body.

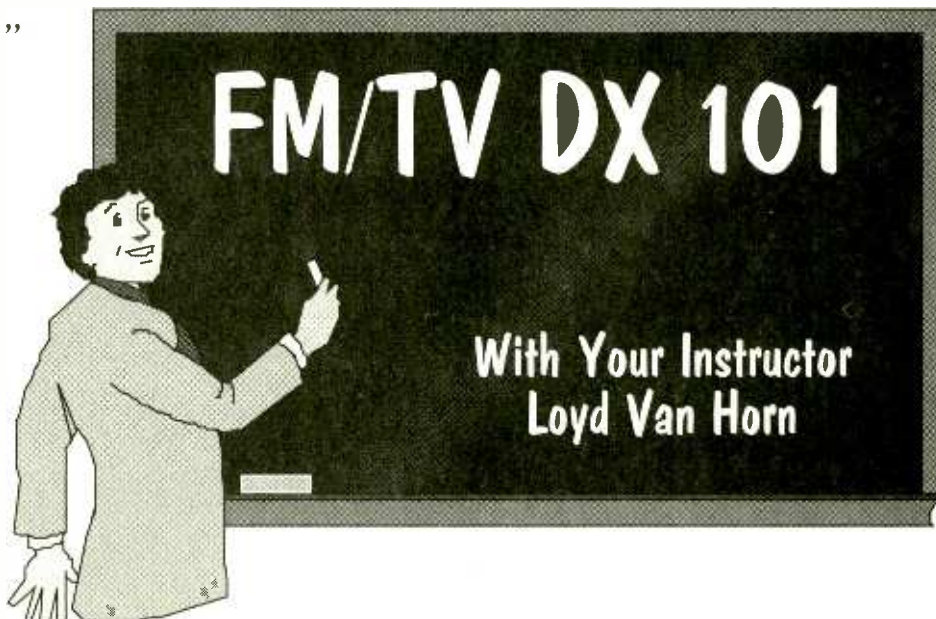
This phrase not only applies to running but to DX as well: *It's not the radio you use, but the DXer behind the radio that counts.* My dad first spoke these words to me last year on my first endeavor into the world of FM/TV DX. I wanted to use the flashy radio with the big, rotating antenna and the big, powerful preamp, so I could pull in those signals.

Son, when the DX is there, it is there no matter what you use. But I didn't listen. Still, perhaps this explained why he was hearing things on a little portable radio that I couldn't hear on the big radio with all the bells and whistles. So finally, frustrated, I asked him. *Dad, why am I not hearing, with all this expensive equipment, the great DX that you are?*

The answer was obvious: *Experience, persistence, and a working knowledge of the art of DX.* Say what? So we sat down and he taught me some tricks of the trade. (Which I am now sharing with you!)

### ■ The Basics

I learned in physics class that FM stands for *Frequency Modulation*. This is just a fancy way of saying that the frequency, or number of radio waves that pass through your receiver



in a given time, is modulated, or altered, so that it varies with the audio signal that is being transmitted.

The first workable FM setup was invented by Edwin H. Armstrong in 1936. At first, people disregarded FM as a way of DX. They figured it was too line-of-sight, and that you could only hear stations within 50 miles or so. Then a few curious people began tuning around their FM dials, and noticed stations well beyond the 50-mile range. Some just blew this off, but others tried to figure out why it was they could hear these far-away stations. Thus began "FM DX."

How do you know when you are hearing FM DX? Here is an example. You are driving to work one summer morning. The New York traffic is a mess. You flip on the FM radio and begin to listen to your favorite station, WHYJ 90.1 "All Jazz hits, all the time." Everything is normal; then all of a sudden, something happens. WHYJ begins to fade. Another station comes in. You realize that WHYJ has been replaced by WEMT. Then you hear them giving a weather forecast,

and you notice they don't sound like New Yorkers.

The DJ says, "And it's going to be 70 degrees today in the greater Omaha area..." Omaha?! Congratulations. You have just FM DXed!

### ■ What do you need to get started?

For equipment, as in the example above, even your car radio will do. I have also had great results using a GE Superadio III connected to a Grove Scantenna with a Radio Shack preamp. In actuality, you can use any kind of FM radio available to you. I have done Es skip off of the stereo in my room. I have heard of people using their Walkmans!

To get better and stronger skip, it is usually a good idea to connect an outside antenna that is rotatable and

is pointed in the general direction of the Es opening. But again, it doesn't take much to pull them in. It is mostly a matter of being at the right place at the right time.

The most important thing to do before undertaking any kind of DX is to get a work-

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ing knowledge of your local FM band. You have to know—under the deadiest of conditions, day in and day out—who is going to be there. Do a complete bandscan, from 88 all the way up to 108 MHz. Be able to call out on demand who that rock and roll station is on 92.9.

Another bit of information that's useful to know is the normal signal level at which the station comes in. From here in Brasstown, I know that if WUSY-100.7 in Chattanooga, Tennessee, is coming in at only an S9, something is up.

There are two main types of FM DX. Tropospheric, or "tropo" for short, and E-Skip, or Es. There are others, ranging from bouncing signals off other layers of the ionosphere such as the F-layer to bouncing them from airplanes and even meteors! But for now, let's concentrate on the main types.

### ■ Tropospheric DX

Most veteran DXers refer to tropo as their favorite kind of FM DX. Tropo occurs best during the two to three hours after local sunrise. What happens is that a "duct" begins to form toward a certain direction. This is a special type of tropo known as "tropo enhancement." For example, while living in New Orleans, a tropo duct would form just about every morning toward Biloxi, Mississippi.



Tropo occurs most frequently near coastal areas, where temperature inversions are great. Really good tropo DX can last anywhere from a few hours to several days, depending on the strength of the duct opening. While not as common, or as strong, there is also a "sunset tropo" opening to watch for.

Knowing what causes tropo to happen will help you become a better DXer. Let's take sunrise tropo for instance. When the sun comes up, as it has for millions of years, it heats up the surface of our big blue planet. This heated air rises, and moves out the colder air that settled in during the nighttime. During this process, an "inversion layer" forms between the newly heated air on the ground and the colder night air atop it.

It is in this inversion layer that VHF/UHF



signals become "trapped" and carried out past the horizon around 300 miles or so. This condition initially starts out low to the ground, where the first thin layer forms. It then moves up at a rate of around 1,000 to 2,000 feet per hour! Once it reaches above 2,000 feet (usually just after local noon, when the peak occurs), the signals can no longer be trapped by the layer, and our tropo opening ends.

There is a variation of sunrise tropo called "double inversion" in which a thin cloud layer forms between 250 and 2,000 feet above the earth's surface, preventing the surface from being warmed; instead, the top of the cloud layer is warmed. This creates a tropo layer below and above the cloud, creating a "double inversion" layer. This kind of tropo can produce DX on one layer ranging from 100-300 miles. The other layer (the bottom) will produce DX from 250-600 miles and more! You can expect these conditions when the skies are clear at night, but in the morning there is a low overcast that is supposed to "burn off" before noon.

There are other forms of tropo, including the aforementioned sunset. Some others include fog tropo (generally a rare condition, because not all fog conditions produce DX), moisture (basically a cross between fog tropo and early morning sunrise tropo), high pressure (once or twice a year, really far-reaching DX, generally lasting all day, for several days), and weather front tropo.

Of all of these, my favorite is the latter.

### ■ Weather front tropo

This follows the principle of inversion layers forming between regions of hot and cold air. Let's say that a cold front is coming down from Canada, moving south or southeast. When it reaches an area where there is a warm air mass in place, it creates an inversion layer up along the front line itself. If it extends from Minneapolis down to El Paso, stations all the way between and including those cities will be heard.

The front should move slowly. It also needs to be strong and straight. Any time you see one that appears crooked on the weather map, don't get excited. VHF-UHF signals follow line-of-sight and need a straight path between point A and point B. The more drastic the temperature difference on the two sides of the

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front, the stronger the inversion layer. Strong storms are not best because they generally break down the layer before they can form. Scattered showers are okay, but flash floods definitely are not.

Not all fronts can produce this type of tropo. In fact, under 10% of them actually do. How long does it last? Only as long as it takes for the front to pass through your area. It could take hours. The tropo will last just before, during, and after the front has passed.

Now that you are beginning (hopefully) to understand tropo DX, let us now browse through FM DX nirvana—Es skip!

### Sporadic E (Es)...a phenomenon of nature

Simply put, Es skip provides the easiest way to pull in very long distance signals. (I use the term "easiest" very lightly). What produces this form of DX is already implied in its name, Es. The "E" represents the atmospheric layer height from which the signals are being shot at your radio. The "S" stands for its nature: "sporadic."

Since the 1930's, when amateurs began probing our ionosphere to see what made it tick, they have noticed Es. All they knew was that whenever this condition would occur, abnormal reception would occur. There are still things about Es we just don't know. But here are some of the things we do. (I will simplify this complicated subject as much as possible.)

What happens is that a "cloud" forms in the E-layer of our atmosphere. This cloud moves along a certain path, and reflects all those VHF signals back down to your radio. It is possible to actually track these Es clouds to help identify stations that you are hearing. The clouds move anywhere from 150-200 miles per hour, and are anywhere from 10-50 ft. in size.

The great thing about Es is that it can happen in any part of the country, and you get great, distant catches from it. The problem is you never know when it will happen (hence the sporadic in its name). Now is the time when Es really begins to rev up its tasty DX brew. You should continue to experience this all through the summer. Another opening should occur sometime around Christmas.

Es will typically last an hour or two at a

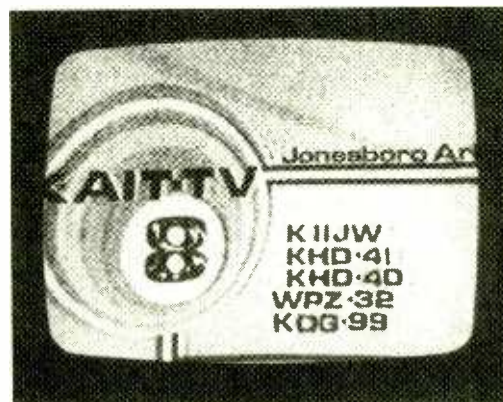
time. However, during Es's annual peak—towards the end of this month, June 21st to be exact—these openings are intense and can last all day. Es skip is a two-way occurrence. So, if you are hearing Florida from New York, then people are hearing New York from Florida. Look for Es to occur most often in the daytime.

The lower the frequency or channel you are DXing, the better the Es will be. It will start on channel 2 and 3 on your TV. You will notice bars and a high-pitched noise on your TV. Last year from here in Brasstown, I was able to DX stations from Colorado and Nebraska on channel 2 during one opening, and I caught the end of the opening at around 2:00pm ELT (eastern local time). It ended around 2:30 to 3:00pm ELT.

Once it situates itself on channel 2, it will begin to move up. Channel 3...4...5...6. Once it gets to channel 6, fire up the FM radios. Once again, start with the lower frequencies. It works its way up through the educational part of the band, the 88-92 MHz region. It continues its way up till it can go no further. This is known as the maximum usable frequency (MUF). Sometimes, openings will reach beyond the 107.9 MHz range, and spread into channels 7, 8, and beyond! Each opening varies. However, last year during one Es opening, I was able to log all the way up to 101.7 MHz.

When Es happens, your DX will generally be confined to one general geographical area.

For instance, the two stations I logged on channel 2 were both to the west of my location. So, I looked for other stations in that general area. Another example is the opening I had that went to 101.7. All of the stations were from the west Texas, eastern New Mexico area. During this opening, I also logged audio from a TV station in Dallas on channel 4 (see Table 2).



### What about TV DX?

TV DX is basically the same thing as FM DX. The frequencies are affected by the same forms of propagation, such as tropo and Es. In fact, you don't really even have to use your TV to DX TV! If you have a scanner capable of tuning the TV/FM bands, tune in the audio frequencies for channels 2-6 (see Table 1). I have logged several stations this way.

Remember that with Es, TV is where it all begins. It starts at channel 2 and works its way up. Es rarely gets above channel 6 or 7, but tropo can work its way up into the UHF band! This makes for some excellent DX.

The equipment needed for TV DX is basically the same as with FM. A black & white TV with a rotatable outdoor antenna, facing in the general direction of the DX itself will do fine. Whether the set is b&w or color is not

TABLE 1

Check these Channel Frequencies for DX Openings

Channel 2	59.75 MHz
Channel 3	65.75 MHz
Channel 4	71.75 MHz
Channel 5	81.75 MHz
Channel 6	87.75 MHz

TABLE 2

The Es Opening of July 1, 1995, as DXed from Brasstown, NC (All times in Eastern Local Time)

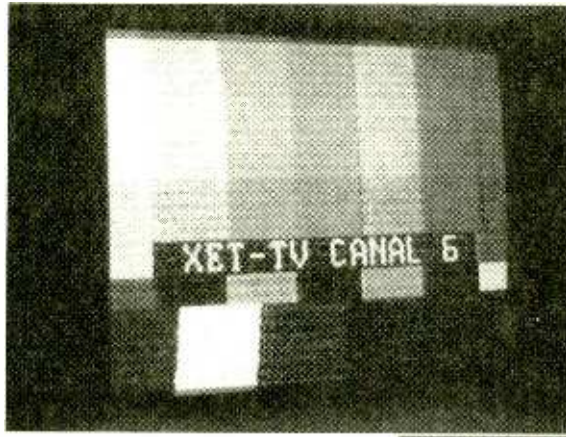
Start	Freq/Chan	Station	End	Comments
2:59	88.7	KTCU-Ft. Worth, TX	3:10	Alternative music, full ID.
3:12	99.9	KGEE-Monahams, TX	3:13	"KG-100" ID, to Country and Western music
3:14	99.7	KBCY-Tye, TX	3:16	"Y-99" ID, to Country and Western music
3:17	99.1	KKKK-Odessa, TX	3:20	"Quad K" ID, religious music, and local ads
3:22	101.1	KONO-San Antonio, TX	3:24	Local ads, ID, oldies music
3:25	100.3	KIOL-Lamesa, TX	3:26	"K-Lite 100.3 FM", ID
3:27	100.5	KSFX-Roswell, NM	3:27	"KSF" ID, many mentions of the UFO crash site
3:28	100.7	KORQ-Abilene, TX	3:32	"Q-100" ID, to Urban music
3:33	101.7	KSNY-Snyder, TX	3:35	Local ads, to ID
3:36	101.5	KOXE-Brownwood, TX	3:37	Country and Western music, local ads and ID in weather forecast
4:00	Channel 4	KDFW-Dallas, TX	4:10	CBS TV audio, (71.75 MHz), Nice ID

critical. Weak signals on a color set will show up without the color anyway, whereas a strong signal in color will provide an excellent snapshot opportunity!

■ **What to do with the stuff we hear or see**

As with any form of DX, once you have heard or seen a station, you must decide what to do about it. Most DXers keep a running logbook of everything they have heard. Some keep tapes of the audio. I have had success using a VCR for my TV DX. You can also take pictures of ID's from the TV using a high ASA film, as mentioned above. We used 400 ASA to snap pictures of IDs from Mexico viewed on channel 6 a few years back.

Some DXers still like to prove beyond a shadow of a doubt that they did indeed log that station. So they write to the station, enclosing details of what they heard or saw, in order to receive a written confirmation of reception known as a QSL. To some DXers, QSL's are prized material and a way of remembering the stations they heard.

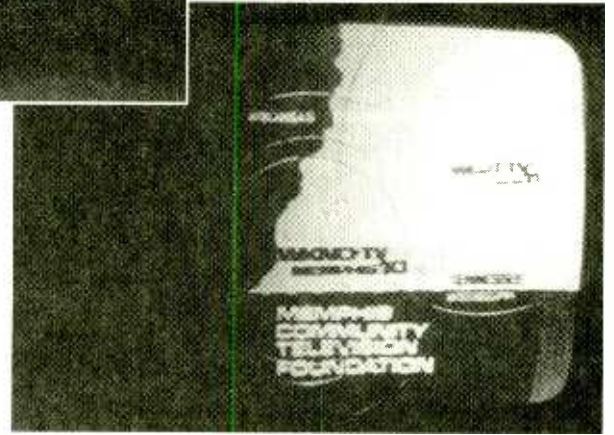


■ **Closing comments**

It is up to you what you do once you have received a station. But another thing my coach always tells us is to make sure that when we run we have fun—otherwise we shouldn't be running at all. It's the same thing in DX: if you don't have fun at it,

then you shouldn't be doing it.

What I find is that the more you learn about your hobby, the more fun you can have by logging more stations. As in track, an educated runner is a good one. So, crack open those books on Es theory, study those weather charts for tropo opening possibilities, and crank up the radios and TVs. Class dismissed. It's DX time!

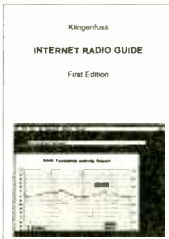


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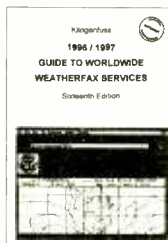
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