How To Fix Your Satellite Reception Problems

LNB SELECTION

An LNB is a combination *low-noise amplifier* and *block downcoverter*. The LNB converts the 4 GHz C-band satellite signal to a more usable 1 GHz L-band signal, which is easier to send over coaxial cable. There are numerous types of available – ESPN recommends Phase Lock Loop (PLL) LNBs.

PLL vs. Digital-Ready or Digi-Ready: If an LNB is labeled as digital-ready, this does not mean that it is also PLL. The PLL LNB has an internal oscillator that stabilizes the frequency output going to the receiver. The PLL LNB stability is usually measured between ± 10kHz and ± 100kHz.

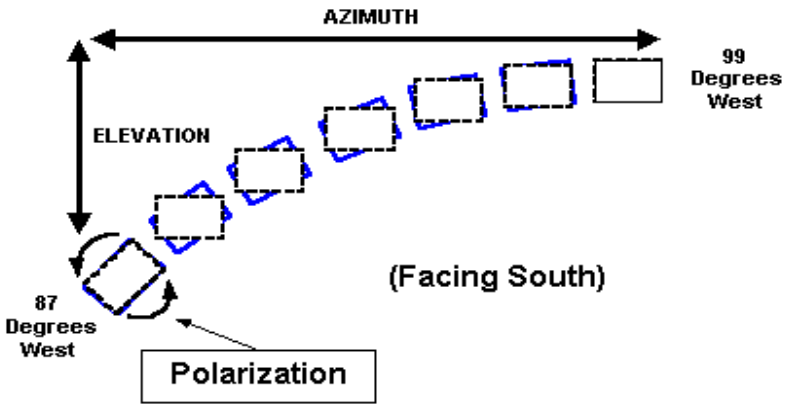
ANTENNA ALIGNMENT

The station's antenna requires four different adjustments for proper alignment: **AZIMUTH, ELEVATION, POLARIZATION and FOCAL LENGTH**.

AZIMUTH: Compass direction the antenna is pointed towards, relative to magnetic north. This is also referred to as the left or right movement (position) of the satellite antenna. When calculating azimuth, you must also take in to account your **DECLINATION**. This is the difference between magnetic north and true north. The declination must be added or subtracted from your azimuth for proper antenna pointing. Azimuth is expressed in degrees clockwise from true north.

ELEVATION: Angle between the Earth and the satellite above the horizon. This is also referred to as the up or down movement (position) of the satellite antenna.

POLARIZATION: Correction between where the antenna is relative to the curvature of the Earth and the satellite's signal beam. The satellite signal is either Horizontal or Vertical polarized, but due to the longitude of the antenna location, the antenna's feed horn must be rotated to correctly match the beam's polarization.



FOCAL LENGTH: This is the distance between center of the antenna reflector and the antenna feedhorn collector.

ESPN recommends a professional satellite technician align your dish antenna. A qualified technician is experienced at making the necessary adjustments (azimuth, elevation, polarization and focal length). The technician may need the longitude and latitude shown on your station license.

If you choose to perform the antenna alignment yourself, you must align the azimuth and elevation settings independently. Once the antenna is pointed at the satellite, minor adjustments should be made to "peak" the antenna, which will maximize your signal strength. ESPN recommends using a spectrum analyzer to align the antenna for least interference and best reception.

Your antenna should be aligned when the satellite is located in the "**center of the box**". All geostationary or geosynchronous satellites drift slightly in their orbital positions above the earth. If your antenna is aligned when the satellite is at one side of this drift, or the "edge" of the orbital position, you may experience interference when the satellite drifts to the other "edge", or an adjacent satellite drifts near the "edge" of its orbital position. You may obtain information on the next predicted center of the box for satellite AMC-8 by accessing the SES World Skies website at http://www.ses.com/7767426/technical-data.

If you are peaking the dish with a spectrum analyzer, you will be able to see if your antenna is picking up any interference around the carrier. The adjacent transponders on the desired satellite will be polarized opposite to the target signal transponder. **When adjusting polarization, it is best to perform the alignment to MINIMIZE the interfering signals instead of MAXIMIZING the carrier's signal strength**. To find out which set of signals on the spectrum analyzer are the "right" ones, listen to the audio from your receiver as you adjust the polarization. If you minimize the signals of one polarization and the audio drops out, that is the desired signal. You should then minimize the signal from the opposite polarity.

You may also use the Pico Digital/XDS receiver SIGNAL STRENGTH to obtain a measurement of reception. ESPN does not recommend using the receiver SIGNAL STRENGTH for antenna alignment as it does not provide the accuracy of a spectrum analyzer. This is because the AG reading only indicates the raw signal strength. This includes both the desired signal and unwanted interference. The Eb/No reading on a receiver gives a better overall reading of signal quality.

If you choose to use the receiver to align your dish, you will need to temporarily relocate the satellite receiver outdoors, where it can be viewed and listened to by those adjusting the antenna. The receiver MUST be locked on the ESPN XDS carrier, with the antenna pointed so that the receiver has enough signal to acquire. Loosen any hardware that holds the dish at its fixed elevation and azimuth angles. If your antenna uses a crank or screw mechanism for setting the azimuth and elevation angles, pick one direction of the azimuth axis, and turn the crank or screw mechanism. Keep turning the azimuth slowly in one direction until the receiver indicates a marginal condition. Stop turning the mechanism.

Reverse the direction of cranking, this time counting the number of turns of the crank or screw. The antenna will move into an area of better signal and then, once you pass the desired satellite, reception will become marginal again. Stop here. Note the number of turns you cranked between when you started at the marginal signal on one side, and when you stopped with the signal turning marginal on the other side. Divide that number in half, and set the azimuth halfway between the two points. Tighten the hardware.

Repeat this exercise for the elevation axis.

ANTENNA PERFORMANCE CHARACTERISTICS

- Parabolic Shape: This is determined by the alignment of the antenna reflector panels. Improper alignment of these panels can affect antenna performance. Once the dish is assembled, look across the diameter of the face from two positions that are ninety degrees apart. The near and far edges should be in a single plane.

  Another method is to take two pieces of string and stretch them across two different diameters of the main reflector at 90 degrees apart. Make sure the strings are taut. The two strings should intersect near the middle of the dish. Ideally, they should just barely touch each other. If the dish appears to have sagged you will need to see what hardware can be adjusted to bring the dish into alignment. You may need to contact the antenna's manufacturer for advice.

Some antennas may have imperfections in the antenna shape: Metal mesh type antennas are susceptible to corrosion, reflector sagging, bending and dents over time. This not only reduces the signal gathering ability of the dish from the intended satellite, but also increases the interference which will be received from adjacent satellites. If the dent cannot be corrected, it may be time to buy a new satellite dish. ESPN recommends solid antenna types. These hold their shapes better over time and will provide longer useful life than a mesh type antenna.

- Positioning of the feedhorn relative to the center of the reflector: The feedhorn assembly must be centered directly above the antenna reflector for peak performance. Even one inch of variation can be enough to significantly degrade reception quality.

  If the feedhorn is not centered, and it's not an "offset" dish, you will need to adjust the hardware to bring it into alignment. If the pole or spar which holds up the feed element sways or moves and cannot be fixed in a central location, it may be damaged beyond economical repair. You may need to purchase new parts from the antenna manufacturer. If a new spar is unavailable, you may need to buy a new dish antenna.

- Focal length: Also referred to as “F/D ratio”. This is the distance between the center of the antenna reflector and the antenna feedhorn collector. Some dish antennas have a fixed-length rod to prevent the focal length from being set incorrectly. Other antennas have adjustable focal lengths and the user’s manual may tell you to set it for a specific measurement. You should use this number as a starting point, and not a final adjustment. Once the antenna is assembled and pointed, you should adjust the focal length for maximum Eb/No on a desired signal.

- Two-degree spacing: Older or smaller satellite antennas may not be able to sufficiently reject signals from satellites adjacent to the one you’re pointed at. Satellite operators utilize higher-powered satellites and locate them closer together. Older antennas that were designed to operate in an environment where satellites were spaced farther apart may no longer be usable and need to be replaced. Smaller antennas (under 3.7 meters/12 feet in diameter) also may not have the necessary design qualities to reject these adjacent signals. You don’t need a big dish to get more signal, you need a big dish to reject <u>undesired</u> signals.