

A Simplistic Approach to Trouble Shooting Satellite Systems

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Many times technicians are sent out to perform maintenance on Satellite Systems without any knowledge of what is really wrong. There are many different ways to perform a simple task of finding and solving a problem. I will present what I feel are the most logical and proven methods of trouble shooting that I have learned during my career working with satellite equipment.

I look at three different methods when faced with a system that is not functioning to specifications. These are not in order but have a symbiotic relationship to each other. The first of the three is call the Rule of 4 “P”s, the second the Rule of Ends, and the third the Rule of Rabbits.

This paper will break down each of these methods but the reader should remember that all three work together, however, any single one method could indeed result in a solution.

The Rule of 4 “P”s

The **Rule of 4 “Ps”** is a simple process which follows a logical progression. Too many times I see a technician approach a problem site and just start a hap-hazard approach at trouble shooting. The 4 “Ps” are **Power**, **Pointing**, **Parameters**, and **Parts**. If one were to follow this progression in the order given, one will see that as each previous “P” is eliminated, then the only remaining “P” is the problem and thus a solution is rendered quickly.

Power

A technician I was working with once exclaimed that he knew exactly what was wrong with the system just by looking at satellite dish. He exclaimed proudly that it was not pointed on the satellite. He spent the better part of his time trying to find a satellite when the problem was the Low Noise Block (LNB) did not have any voltage being applied.

Power is simply AC or DC voltages driving all the components of the system, not the amount of power in dB at the receive or transmit ports. One must make sure that if a piece of equipment requires power that the appropriate power is provided. This goes to the old adage, “is the ON/OFF switch in the ON position”? Another term that is near and dear to my heart is call Satellite 101 which is a basic function of – is it on?. Confirm that all components that require power to operate are indeed receiving the correct voltage. If needed, draw out a block diagram and confirm what needs power.

Pointing

Once you have confirmed that the first of the 4 “P”s is eliminated, one can proceed to checking to see if indeed the dish is pointed correctly. One must remember that pointing encompasses three axis’s; *Azimuth*, *Elevation*, and *Polarization*. All three are required to be exact if one desires to have an efficient receiving and transmitting system. It is imperative that the satellite be boxed in Azimuth and Elevation. Then with a spectrum analyzer, or the assistance from the Satellite Provider, ensure the Polarization is set correctly.

Parameters

One can spend an entire day working on a system and not realize the parameters are incorrect. A sure show stopper is to arrive on site, verify the power is good and point the antenna and still have no service. All for the lack of a correct value in the option or boot file of the modem. Of the 4 "P"s, this is probably the simplest. Before departing to a site, ensure you have to correct files for that particular system. This will ensure that if one is 100% sure that Power and Pointing are accomplished, then reload the files. A word of caution here, do not jump the gun and assume the parameters are incorrect and load the file.

Parts

When one is convinced that all the above is complete and have been eliminated, only one option remains; faulty parts. However, again, one should not just assume that a part is faulty until all possible causes are eliminated. Determining a faulty part is more difficult than the other 3 "P"s. For a receive chain, one needs a spectrum analyzer. For the transmit chain, one needs either a spectrum analyzer or the assistance of the Network Operations Center. "Seeing" with a spectrum analyzer can reduce the amount of investigating needed.

The Rule of Ends

The **Rule of Ends** simply states that "One should start at one end of the chain and work their way to the opposite end of the chain. Never start in the middle". This is a very simple but effective rule. Funny how sometimes one will find a cable unplugged or worst yet, loose. Many a problem can be solved by just giving the system a once over.

The Rule of Rabbits

This by far is my favorite rule. The **Rule of Rabbits** states that "One should never try to chase more than one rabbit at a time". When trying to diagnose a system problem that has multiple problems, one needs to concentrate on solving one at a time. Before one can transmit, one must first receive so start with the receive chain. This holds true to any form of data communications equipment. If one starts to chase multiple issues, or rabbits, at the same time, one will surely fail in restoring a system in an expedient manner.

Summary

Trouble shooting, if done in a logical approach and with a determination to solve the issues quickly, can be a painless process. All one need do is follow a set of logical processes and one will indeed solve the issue. There is nothing more satisfying than going to a customer's site, sitting down and examining the problems, and coming up with a solution, all before your morning coffee.