SOLVING INGRESS PROBLEMS OF FOREIGN SIGNALS

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Guam Cable TV System

The entrance of foreign signals into a CATV System can cause serious problems. There are off-the-air carriers throughout the spectrum used in CATV. The unwanted signal on your system can disrupt service and cause a flood of customer complaints. The following is an inexpensive, field proven method to locate the exact point where ingress of foreign signals can occur.

The entrance of foreign signals into a CATV System can cause severe problems whether you have 30 channels with dual pilot carriers, or less than 12 channels with no pilot carriers. The most common problem exists in the 73 MHz region which the FCC has allocated for aircraft beacons. Ingress of signals at this frequency can disrupt your pilot carrier causing erratic or no automatic gain control. The citizens' band operates at 27 MHz, and the second harmonic falls at television channel 2; the third harmonic is in television channel 6. It is possible for a citizens' band carrier to enter your system and disrupt both channels. The military is allocated the area from 7 MHz to 29 MHz, where two-way return with data is carried on your system. Entrance of even a low level of foreign signal in this area can make the return signals unusable. From 108 to 162 MHz is a combination of allocations for both civilian and military use. Ingress of outside signals in this region could ruin one or more of your mid-band channels. Above channel 13, 230 MHz to 400 MHz, is radar and other communications which can cause trouble in the low channels of your super-band. In short, the entrance of foreign signals into your system can cause sleepless nights and angry customers. Also, if outside signals are getting in, CATV signals are getting out and you are most likely in violation of FCC radiation limits.

Until recently there has been no tried and true method to locate the point of ingress. A device has been recently placed on the market that is said to perform the task. However, the price is $1,000. Having a serious ingress problem on my hands and not having a grand to plunk down on a new gadget, I developed a simple and inexpensive method which proved satisfactory in the field. Basically, all you do is apply a strong signal into your system so it will radiate out, a signal you can easily detect. Find the point where it radiates out and that's where the foreign signals are getting in. Use a dipole antenna connected to a signal level meter with an audio detector circuit. Drive along the system and listen for the radiated signal. Although this method was field tested on an overhead system, it can be used on an underground system. The transmitters in your area may make it difficult or impossible to hear the signals radiating from your system. The secret to the success of this whole idea was to modulate the system signal with a 1 kc tone. It is easily distinguised from any off-the-air signal.

Apply the 1 kc tone modulated signal to your system so its level is 40 db above normal system levels. A higher level of signal can cause limiting in the amplifiers.

My particular problem was the signal of several military transmitters getting into the low-sub system from 7 MHz to 29 MHz making channels T-7 and T-8 unwatchable. The presence of the high powered transmitter near the system made it impossible to hear the radiated system signal. I used an R. F. signal generator with an output capability of 50 DBMV that had a built in 1 kc tone. I applied the tone modulated signal to the system by connecting the R.F. generator to the input of the low-sub post amplifier. A standard head end may require

the use of an amplifier after the R.F. generator to obtain the necessary signal level. With all other carriers removed and the R.F. generator tuned to 25 MHz we began the search. With the dipole antenna connected to the signal level meter we drove along the system. I used a Jerrold 727 meter which has a built-in speaker. We found meters which required the use of an external earphone effective; however, the Jerrold 727 proved easiest to use. Driving along the system, we first heard the tone 4 poles away from a bad splice. The tone grew considerably louder as we approached the splice. As we passed the splice, the tone reached its maximum volume and began to decrease in volume as we moved away. After replacing the splice we could detect no trace of the tone. Continuing the search we found three other locations where the tone was heard. When all locations were repaired, all the foreign signals were removed from the systems making channels T-7 and T-8 usuable.

To use this method to test a return line ingress problem on a two-way system, connect the signal generator to the input of the return amplifier farthest out from the head-end. The output of the generator plus the gain of the return amplifiers will provide enough signal to radiate out and be detected by the antenna and meter.

I stress the use of an R.F. signal generator, however, another signal source may be used. Success depends on using a 1 kc tone. Have the tone-modulated signal operating at an R.F. level as high as possible. If limiting occurs, lower the R.F. level of the test carrier until the gain of your system amplifiers restores and begin the search. WHERE YOU HEAR THE TONE, CATV SIGNALS ARE GETTING OUT AND FOREIGN SIGNALS CAN GET IN.