

Guardian System II

Why Every HFC Network Offering VoIP Should Have Guardian System II



The Guardian System II Monitoring System will enable you to:

- Find problems before they impact the subscriber.
- Shorten MTTR (Mean Time To Repair).
- Attract and keep customers.

Why Monitor the Return Band?

The addition of VoIP services to the array of cable network offerings brings an exciting opportunity, but also presents some challenges.

The quality of the offering can be seriously impacted by the quality of network maintenance. In order to minimize operating expenses, unplanned service calls must be held down, and customer satisfaction must be kept high. The return band must be continuously monitored, to quickly detect CPD (Common Path Distortion), and ingress. Some forms of interference, like CPD and types of ingress that are persistent and would appear using any type of analysis.

Other types of noise are more "bursty" in nature, and are intermittent and may be very transient, appearing in some cases for such short instances that many monitoring systems find them undetectable. In services that don't require real-time connectivity, such as high-speed data, these intermittent, transient issues may have little impact, as the interrupted packets are resent, and the delay may go unnoticed.

When it comes to voice communication, interruptions like these are very noticeable and cannot be ignored. The addition of voice services is an entry into a competitive market with an expected level of quality. If these quality expectations aren't met, the cable system runs the chance of not only losing the added revenue of voice services, but also in today's competitive environment losing the subscriber completely.

Why Choose Guardian System II?

By experience, it is known that the return band is very susceptible to interference from CPD (Common Path Distortion), ingress and impulse noise. While a cable network carrying digital video and high-speed data may operate without a significantly high number of service calls, it may still have problems supporting VoIP, because digital video and HSD services are relatively robust, and are able to withstand interference that causes packet loss and jitter.

To some extent, these problems have been averted through advanced modulation techniques, FEC (Forward Error Correction) or retransmission of lost packets, but unlike digital video and HSD, the VoIP transmission is real-time, and while FEC may have a limited effect, retransmission of data is not an option.

The Guardian System II™ is very fast, and can catch "bursty" impulse noise and ingress. Here's why that's important.

Most of the monitoring systems on the market use a frequency scanning analysis of the return band, with limits set to detect ingress and noise problems.

When the alarm limits are crossed, a "trap" or alarm is triggered. The limits are configurable, and the alarm is scalable, to gauge the response urgency. The challenge for these systems is to be able to "catch" the transient, intermittent noise or ingress.

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There are two reasons why this is difficult.

- There may be a large number of nodes to be monitored, and a limited number of monitoring analyzers. The transient could occur while the analyzer is looking at another node.
- Even if you had a separate scanning analyzer for each node, the analyzer may be at another frequency when the transient appears. The monitoring analyzer must be very fast in order to catch a fast intermittent transient noise or ingress signal.

The Trilithic 9581 SST™ R4 uses DSP technology that enables it to "see" transients that other monitoring systems miss. It works by essentially taking a snapshot of the entire return spectrum 80 times a second (every 12.5 milliseconds).

The snapshot is a 90-microsecond sample that is digitized to display the spectrum. It displays the entire spectrum in about the time it takes an analog spectrum analyzer to display one frequency.

(The snapshot is actually a look at all of the signals present at a given instant, which is digitized, and then converted to a frequency domain display using fast Fourier transform.)

THIRD PARTY SPEED TEST

A recent speed test performed by a third party revealed why speed is important.

The test procedure imposed bursts of RF energy timed to cause a 5% loss of packets. This is a level of impulse noise that would severely impact a subscriber's telephone service.

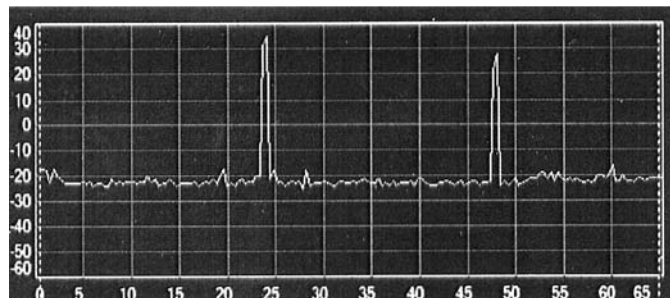
During an hour's testing, only the Trilithic Guardian System II detected this interference effectively, and it never missed an impulse.

No competing system ever captured the full impulse signature, and very rarely detected anything at all.

The following screen views are typical. All three screens were recorded at the same instant in time.

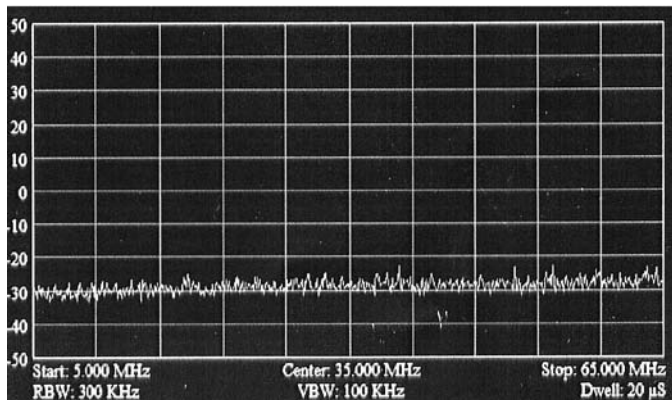
Trilithic Guardian System II

The Guardian System II detected and accurately plotted every impulse, every time. Note that the display shows both the impulse at 24 MHz and its harmonic at 48 MHz.



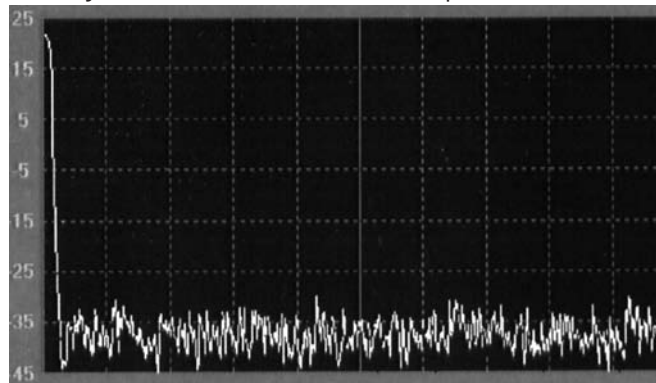
Brand X

This system detected the impulse only once during the entire test - and even then it missed the harmonic.



Brand Y

This system did not detect the impulses at all.

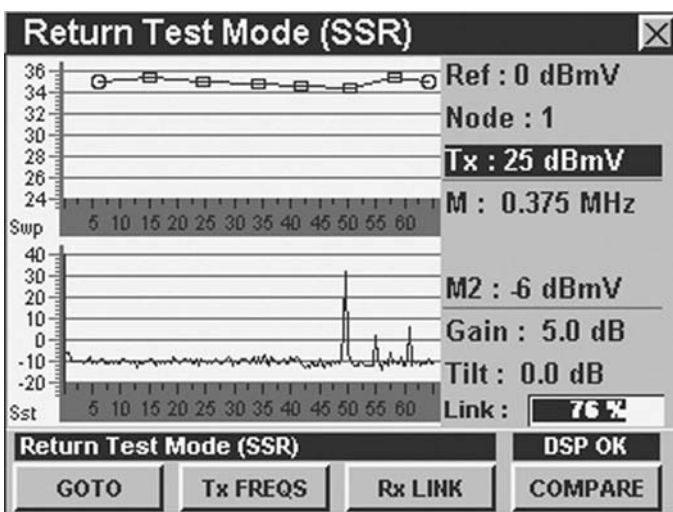


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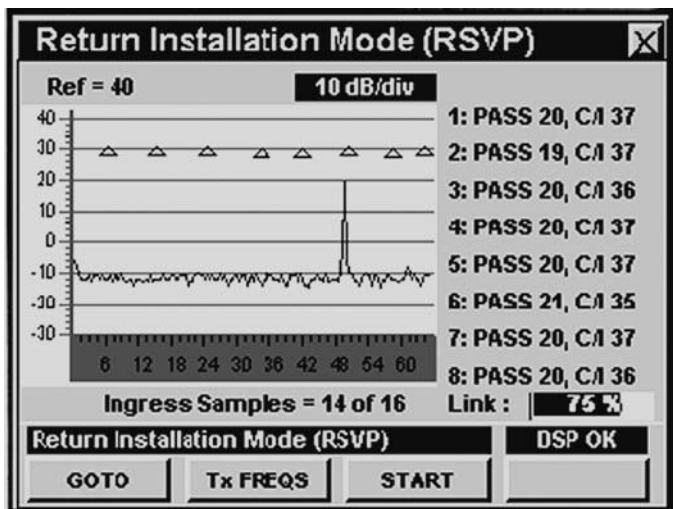
Distribution System Alignment and Maintenance (integrated with 860 DSPi)

The Guardian System II is not limited to return path monitoring. It is also fully compatible with the Trilithic 860 DSPi™ to make it the most effective return system sweep and balance system available.

Remote access brings the power of DSP to the field, allowing technicians to view impulse noise bursts in real time.



Troubleshooting ingress is made simpler and quicker by enabling technicians to view the return spectrum at the local test point, and as it is being received in the headend or hub site.



The 860 DSPi can also be used to test impulse BER, and VoIP each way and roundtrip.

For more details, see the www.860DSP.com website for additional Application Notes.

The 860 DSPi browser interface enables interaction with industry leading workforce management.

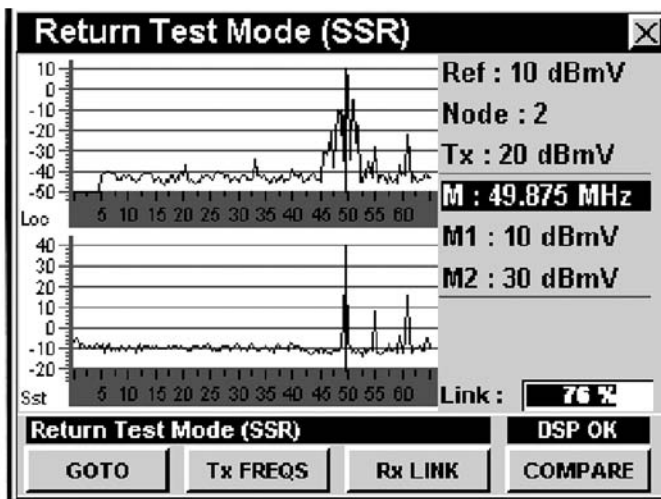
Two-Way Service Installation (integrated with 860 DSPi and RSVP²)

The Guardian System II simplifies installation of two-way services through integrated use of the Trilithic 860 DSPi and/or RSVP²™.

This feature ensures proper installation by calculating the return path C/I from the subscriber to the headend.

By determining the required upstream transmit power from the subscriber, proper installation and alignment can be verified at every installation.

A simple pass/fail result makes the test efficient and cost effective.



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BRINGING IT ALL TOGETHER

The Trilithic Guardian System II, a second-generation return band monitoring solution meets the needs of state of the art HFC networks.

The Speed of DSP Technology

- Unrivalled speed of spectrum acquisition, means it can catch transient impulse noise and ingress that other products just don't see.
- TrafficControl™ enables seeing interfering signals "beneath" legitimate system carriers.

Management Metrics Made Available Through Comprehensive Reporting

- SNMP traps generate configurable alarms to aid in response prioritization.
- Historical information helps in analysis of time and cause of interference.
- Compatible with industry leading workforce management systems.

Productivity and Efficiency of a Complete System

- Optimal tool for return sweep, balance and troubleshooting.
- Compatible with Trilithic's RSVP² Installer's Reverse Tester and 860 DSPi for proactive analysis and management of system performance.

