TRILINES

TRILITHIC
INNOVATIVE ENGINEERING

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Monthly Newsletter for Telecommunications Products and Solutions

10,000 Guardian RSVPs In Use Worldwide

This month *Trilithic* shipped its 10,000th Guardian RSVP™ Installer's Reverse Path Tester. In use throughout the world, the RSVP is fast becoming every Installer's standard tool for verifying return path performance during subscriber installation.

Why is the RSVP so popular? In part, because it equips the installer with a complete "mini-test set", containing all of the functions needed to verify that the return path is functional from the subscriber to the headend. With the Guardian IsoMeter™, the RSVP also tests the ability of the cabling in the home to resist ingress. From a management viewpoint, one big advantage of the RSVP is that provides a reliable yardstick for return path performance, one that can be used by all of the personnel who work in the system. "Our CATV installers, data installers and even contractors are

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The Guardian RSVP² Installer's Reverse Path Tester

Engineering Gets New Satellite Dish

Trilithic's EAS Engineering has set up a new Satellite Receiving facility for use in developing Emergency Alert network products. Already the first of these products is approaching release: a new data transponding device that helps cable operators to shorten the delay between receiving weather related information from NWWS (NOAA Weather Wire Services) and using this information to alert their subscribers to life-threatening weather conditions. Available only for the *Trilithic EASy™ Alert System*, the new communications device drastically shortens EAS warning delays, cutting the current worst-scenario figure of six to sixteen minutes to as little as six seconds.

Efficient communications of alert messages over large areas and many systems improves the life-protecting value of an EAS system. The new Satellite Receiving Facility will speed the design of new and innovative network products that enable operators to make better, broader and swifter use of their *Trilithic* EASy installations.

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required to use the RSVP to test Shielding Integrity. Even our Door-to-door sales reps for digital upgrades carry them." Says Ricky Blair, Technical Supervisor at Insight Communications in Lexington, Kentucky. "Every install is checked - digital service upgrades and new installs - it is also used on callbacks. The installers are required to check each outlet with the RSVP for good return path for future upgrades."

An installer has little time for complicated testing, so the RSVP's speed and efficiency contribute to its wide popularity among installation departments and contractors. To Ricky Blair speed is a real plus. With the RSVP, adding return testing to an installer's procedure "doesn't take much time away from the normal installation process, because [The RSVP] has a good response time."

Another reason the RSVP has been so well received is that it is automatic and very simple to operate. "An hour's worth of training and most [personnel] are ready to go," comments Ricky Blair, "even sales people who are not technically trained." When the installer presses the "TEST" button, the RSVP takes over, automatically opening communications with a Guardian 9580SST™ Reverse Analyzer mounted in the Hub or Headend. Signals pass between the two units, signal levels and carrier/ingress ratios are swiftly computed, and the RSVP gives its verdict, "PASS" or "FAIL". If data is desired, another button shows the installer the actual values for "launch level" and C/I, useful in troubleshooting.

The RSVP is also a reliable instrument, built for heavy, daily use. Says Ricky Blair, "[The RSVP] is a 'rugged environment' instrument, a tough piece of equipment that withstands wear and tear of normal use." Being small and light contributes to the toughness, and the thick ABS plastic case also helps. A big factor in the RSVP's reliability

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When You Can't Use Channel Tagging Use the Searcher Plus GT Advanced Leakage Detector

The Searcher Plus™ and Super Plus™ leakage receivers are the standards of the industry, with tens of thousands in daily use. The Super Plus was specifically designed for use in areas with overbuilt systems, and has proven its immunity to "false alarms" from the other system's leaks and from electrical noise of all kinds.

The Super Plus gains its immunity from *Trilithic's* patented Channel Tagging System, a technique that hides an identification signal in the video signal used for leak testing. The Super Plus tagged leakage detection system works well in most cable systems: The Super Plus detects the tagging signal, and the circuitry of most set top terminals cancels its effect on the TV picture. However, some recently introduced digital set top terminals may be adversely affected by the tagging signal. For systems using these terminals, the new Searcher Plus GT™ is the perfect alternative.

Introducing The new Searcher Plus GT

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is its reliance on *Trilithic*'s patented DSP technology, which eliminates much of the fragile hardware that is prone to failure in an analog-based instrument.

The Guardian RSVP tests the return path from the subscriber to the headend, but it performs other chores as well. For "ringing out" cables, the RSVP can be set to "SOURCE" mode, which generates a continuous tone modulated test signal. With a Signal Level Meter, the installer can use the signal to identify cabling, especially useful in MDU installations.

"SOURCE" mode also helps find weak spots in a subscriber's cabling before it is connected to the HFC system: the RSVP can be set to produce a tagged 28 MHz test signal. The signal is injected into the home's cabling, and any trace of the signal that is detectable by a Guardian IsoMeter™ Reverse Leak Detector means damaged cable, loose connectors or other faults that would admit ingress at some inconvenient time in the future.

Fine-tuned for the application, simple and tough, the Guardian RSVP^2 is likely to find ever-growing acceptance by the broadband industry as the standard tool for proofing the return path during installations.

Ricky Blair summarizes the RSVP's appeal. Before the RSVP, "nothing in the market could give every installer the ability to insure a good return path." The installers and troubleshooting service techs are very satisfied with the RSVP and contractors even purchase their own RSVPs because we require their usage. Standardization is the way to make sure the return path is always good, so we require our installation personnel to use the Guardian RSVPs. Always."

How it Works

To verify the return path, the RSVP first determines the RF output level that the set top terminal must supply to be received at the headend. The RSVP then uses the ingress data from the 9580SST to calculate the return path Carrier/ (Noise + Ingress) ratio (*as in figure 1 below*). The measurement results are compared to operator-settable limits and displayed as "PASS," "FAIL," or as measurement data.

Used with the Guardian IsoMeter Reverse Leakage Detector, the RSVP tests the shielding efficiency of house cabling. Set to SOURCE Mode, the RSVP generates a tagged test signal, which is injected at the ground block (*see figure 2*). The Installer then uses the IsoMeter to track down any points in the cabling where the test signal is detectable. If no leaks are found, the subscriber's cabling will be virtually immune to ingress.

Figure 1

Figure 2

Track Down Ingress Fast with the I-Stop Probe

Did you know you can pinpoint an ingress source down to the tap without removing reverse modules or diplexers and without disrupting forward or reverse service? It's simple with *Trilithic's* I-Stop™ Reverse Test Probe. The I-Stop Reverse Test Probe is an accessory for the Trilithic 9580 SSR Return Field Unit that simplifies the location of reverse ingress sources. Just screw the probe into a port on a distribution tap, connect your 9580 SSR to the handy -20 dB test port, and press the button on the I-Stop Probe: The SSR's display immediate shows you whether the ingress source is between this tap and the node or farther out in the distribution system.

How it works:

The I-stop probe is used with the 9580 SSR. The SSR is a field instrument that works with a 9580 SST Headend Unit mounted in the Hub; together, the SST and SSR are a system used to balance return amplifiers and hunt for sources of ingress. The ingress spectra displayed by the SSR are transmitted to it by the SST and show the amount of ingress arriving from a given node's service area. If an outbreak occurs, the operator uses the I-Stop probe and the 9580 SSR Field Unit to find where in that node's service area the ingress is entering the system.

The I-stop contains two assemblies, a -20 dB "SPD-20" type test point adaptor usable from 5 - 750 MHZ; and a frequency-limited termination that is impressed across the CATV line when the I-stop's button is depressed. The termination is preceded by a "half diplexer" so that the effect of the termination is limited to return band frequencies.

When the I-Stop probe and 9580 SSR are connected to the tap as shown in *Fig.1*, the display of the SSR might look like the top trace example in *Fig 2*. When the button on the I-Stop probe is then pressed, the terminator loads down the return path and decreases the gain in that path by 4-6 dB. (This range of values was chosen to allow a clearly visible response on the SSR's display while not attenuating the return path enough to interrupt service.) Whether a change occurs in the SSR's ingress display when the button is depressed depends on whether the ingress source is closer to, or farther from the node, than the tap where you are connected.

- If the source is farther from the node, and on this distribution line, the ingress signal will be flowing through the tap to which the probe is connected. When the button is pressed, the ingress will decrease by 4-6 dB, as measured by the 9580 SST connected in the Hub. which transmits the ingress display to the SSR. The operator observes that the ingress decreases when the I-Stop's button is pushed and knows that its source is farther out on this distribution line.

- If the ingress is entering the distribution system through another line, or is closer to the node on this line, the ingress will <u>not</u> be flowing through the tap, so pressing the button will have no effect on the ingress spectra measured by the 9580 SST in the Hub and transmitted to the operator's 9580 SSR. Because the SSR's display does not change when the probe's button is pressed, the operator knows that the ingress source is either closer to the node or on another distribution line serving the node.

Searcher Plus GT Continued from page 2

The Searcher Plus GT requires no tagging signal, but gains its resistance to overbuilt signals and electrical noise from a combination of new circuitry and a new application technique. The new circuitry analyzes the frequencies around the carrier frequency at two bandwidths. The distribution of energy in the two bandwidths tells the Searcher Plus GT if the detected energy is signal (a leak) or electrical noise (for example, someone's ignition system). This analysis of detected signals gives the Searcher Plus GT high resistance to false alarms due to noise.

The Searcher Plus GT gains its resistance to alarms due to leaks from overbuilt systems through carrier frequency offsets. A carefully-chosen offset in the frequency of the carrier used for leakage detection can be used as a "marker" to simplify identification of a leakage source, provided the leakage receiver has a sufficiently narrow IF resolution.

For Example, Suppose that the operator of one system has selected for his monitoring signal a video carrier at 109.2750 MHz, but an overbuilt system also has a video carrier also operating at 109.2750 MHz. The next "slot" below 109.275 that would still be in compliance with the FCC aeronautical regulations is 109.225 MHz. This frequency is ideal because it falls between the sync sidebands of the competing carrier *(See Figure 1*). The nearest competing sideband is 2.80 kHz from the carrier chosen for leak detection, and this is enough frequency separation for a leakage receiver with sufficiently narrow IF bandwidth and a good shape factor (such as a *Trilithic* Searcher Plus GT), to easily reject leaks from the competing system.

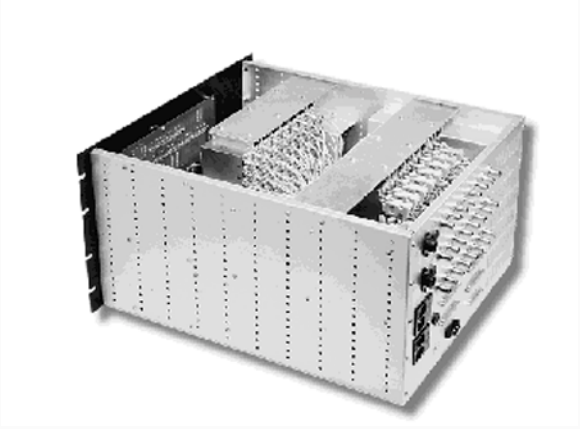
Above 118 MHz through 137 MHz, allowable offsets are +/12.5 kHz. For these channels, a leakage carrier set to the lower offset frequency falls 6.47 kHz from the second lower sideband of the competitor's envelope *(See* Figure 2). Offsetting can also be used on the common monitoring frequency of 139.25 MHz. Since 139.25 does not imply an offset, the channel frequency of the primary system should be offset 25 kHz lower than normal, placing the video carrier at 139.225 MHz *(See Figure 3).* All of these offsetting schemes provide excellent resistance to false alarms from overbuilt systems.

Despite its high performance, the Searcher Plus GT, no larger than a Searcher Plus, fits into the Searcher Plus mobile mount and can be used with the same antennas. The Searcher Plus GT is the ideal instrument for tracking down the telltale leaks that indicate signal ingress problems.

Technical Tidbits

You Asked -We Answered

What is it?



RFM-56 Remote Test Routing Switch

Trilithic integrates a wide range of standard and custom RF switching systems for communications signal routing and for manufacturing test applications. The RFM 56-56™ is a 75 Ohm, bi-directional, 56:1 RF multiplexer designed to operate over the frequency range of DC through 300 MHz.

As a bi-directional system, any one of the 56 inputs may be directed to the common port or the common input may be directed to any one of the 56 outputs. This arrangement allows the operator to remotely switch test instruments to any connected test point. The RFM-56 is an integration of several standard building blocks including T*rilithic's* model GP-1 GPIB interface, the model TTL-128 TTL I/O card, and the model 7208F-12V TTL1x8 switches, and a universal power supply accepting 90 through 250 VAC at 50-60 Hz. Using these standards, mature modules as system building blocks allows for ease of repair and improves overall system reliability.

NCM-4 Part II

...Continued from last month

Question: **I've received my 9580 SST with the NCM-4 Network interface installed and I have connected it to my PC. What is the next step to connecting it to my Network?**

Answer: Assigning IP Addresses and Passwords

1. The initial setup of the NCM-4 should always be done via serial connection. If you find it necessary to change the IP Address after the initial setup of the NCM-4 you can do this via your network.
2. To change the IP address in the NCM-4, select the NETWORK ADDRESSES button in NCM Setup software. The SELECT NCM window will appear which requires you to select the manner in which you are connected to the NCM-4.
3. There are two ways to set up your network addresses.
   a. Select the appropriate "Com Port" if connected via serial connection using the cable supplied with NCM Setup software. The Administrative password is not required to make changes via serial connection.
   b. Set port to "Network." Enter current IP address of NCM you wish to change. Enter your Administrator Password.
4. After Selecting the connection method Press the "Select" button. The NETWORK ADDRESSES window will now appear. Highlight the IP Address block and edit the address.
5. Click on the "Select" button to confirm the change.

Next Month, Part 3, assigning passwords.

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