

## Monitoring by Exception and Seamlessly Transitioning to IP Diagnostics Tools Keeps Live and Studio Production Streams Flowing

The Telestream Inspect 2110 can be paired with the PRISM Media Analysis Platform to create a complete solution for monitoring and diagnosing issues in ST 2110 and ST 2022-6 media networks. Inspect 2110 can watch for problems so your high-value engineers don't have to. When notified, they click one button and begin diagnosing with PRISM. It's a total solution that makes everyone more productive.

### Introduction

As the media production industry moves toward IP network infrastructures, diagnosing and resolving faults in an ST 2110 IP media network requires moving to network-centric, versus point-to-point, root-cause analysis. The most agile and streamlined way of doing this is to allow engineers to focus on resolving problems quickly rather than staring at monitor walls. Monitoring by exception employs sophisticated software to monitor your most important streams and to proactively notify the operators and engineers of anomalies. This enables engineers and operations staff to perform their day-to-day tasks while a software tool monitors the facility for them. Such a solution only alerts staff members when there is a problem and then it directs them straight to the area of concern. When a problem occurs, your experts can seamlessly transition to an IP diagnostics tool to do what they do best: find and fix faults, fast. This is the key to reducing fault isolation and remedy time.

Everyone in your facility must focus on their primary role. They need to get their job done in a time-pressured environment. Editors, operators, and even some engineers should not have to think about the physical layer of the infrastructure underlying their work environment. That should be transparent because they don't really care how content gets to and from them. They just care about having that content to do their job efficiently. Monitoring thus has a direct business impact in terms of reducing inefficiency and minimizing lost time in a cost and time-sensitive environment.

### IP Media Brings New Challenges

From the days of analog television through the transition to serial digital (SDI) the main mechanism for moving media has been, and continues to be, via point-to-point connectivity. Video and audio routers became, and remain, multi-million-dollar investments with millions of feet of cable, including separate video and audio cabling and even separate routing matrices which add to the complexity.

There is, however, an upside in these point-to-point systems; it is easy to diagnose a loss of signal integrity. That changed when IP media networking became a reality. New instruments were needed, and they could no longer be designed to work with only one type of infrastructure. IP media connectivity reduced the expense of cabling and large-scale point-to-point switching matrices but the timing challenges, the multiple paths that a single media stream could take, and the lack of frame-accurate determinism brought with it a whole new set of difficulties. Thus, the ability to quickly diagnose and resolve both IP and media essence issues became a fundamental value provided by a media analysis platform such as a waveform monitor, network analyzer, or the combination of the two. Such analyzers are fantastic when you are performing a deep-dive analysis of an individual signal chain or a few streams within an IP-based media facility: a Waveform Monitor/Network Analyzer is all you need. But the scalability of IP requires a different approach because you must deal with multiple streams flowing across the media network.

The cases where you must worry about only a small number of signal paths are diminishing over time. Today, you may have many contribution feeds and many signal paths carrying mission-critical transmissions with which to concern yourself. You likely have service level agreements (SLAs) that directly affect your revenue and expenses. Your business is impacted financially if you fail to find and correct even a single error. Engineers staring at a monitor wall and using waveform monitors alone will find the challenge of never missing a single SLA commitment a stressful and difficult, if not insurmountable, one. The first key is to focus only on your critical streams. The second is to have an automated probe assist in the task. A probe that monitors your critical paths by exception is an ideal way to reduce stress, increase efficiency, and ensure you meet your contractual obligations.

#### IP is More Flexible but More Difficult to Diagnose

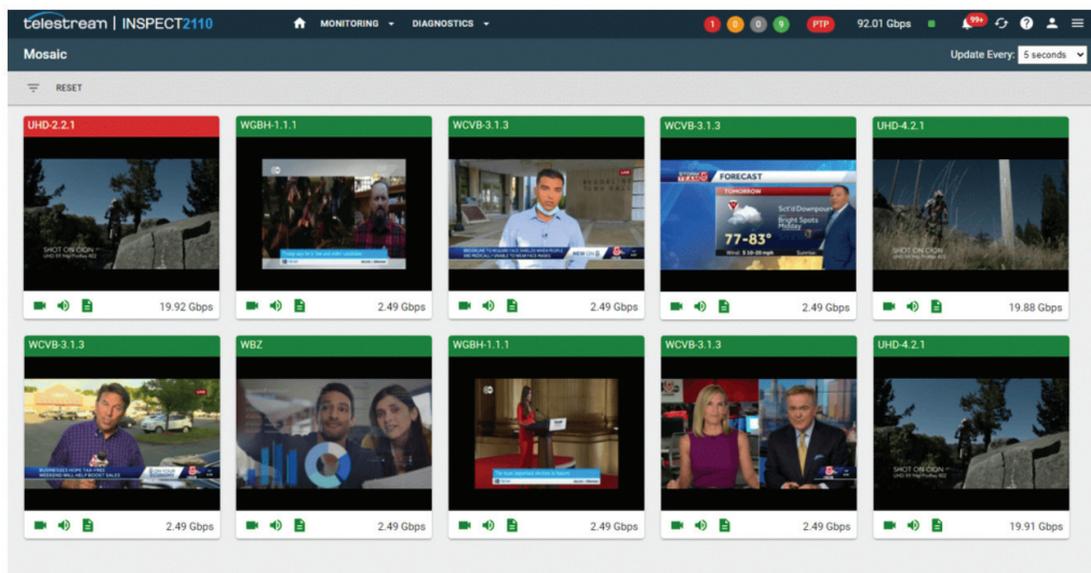
It used to be relatively straightforward to diagnose SDI issues because you could just trace a point-to-point signal path to isolate a problem. But monitoring everything was not practical because the cost of routing signals just for that purpose was prohibitive. Conversely, with IP media it is possible to have complete visibility of what is happening. Unfortunately, isolation and diagnostics are more difficult because there are no longer separate point-to-point pipes and signal flows are less orderly and are non-deterministic.

IP media networks appear more challenging to monitor and diagnose than SDI because every packet can take a different path from source to destination. Our familiar troubleshooting and diagnostic techniques need thus to be redefined for IP networks. One reason we say “non-deterministic” is that the arrival times of two consecutive packets are not precisely predictable. Another cause of unpredictability is congestion inside of a switch or anywhere along a path. Congestion delays the packet’s ultimate arrival times and causes them to get to a destination device in a different order than they were sent. This causes undue latency or its inverse, burstiness. Path unpredictability, congestion, latency, and burstiness all add up to non-determinism and create diagnostic challenges.

So, IP provides the ability to have visibility of everything but, with so much data, and so many ways it can travel unpredictably, doing so is essentially impossible without narrowing the focus to specific issues within the stream. That visibility is now practical using monitoring probes like Inspect 2110. Such a probe can effectively monitor your critical contribution and distribution feeds and provide a simple model for doing so. This is called “monitoring by exception” and it relieves engineers and operators of the tedious task of manually searching for errors.

#### Isolating Problems and Focusing on Anomalies

Among myriad signals, you need to quickly identify the few problematic ones so that, to the extent possible, you can narrow the scope of your error correction task. With IP there are potentially numerous possibilities for errors. The ability to narrow your focus lets operators and engineers concentrate on rapid error diagnosis and remediation. This you can do by augmenting your Waveform Monitor/Network Analyzer with a probe capable of monitoring many streams and notifying you quickly when a specific signal exhibits behavior that is an exception to what is expected. The monitoring of many streams (say, contribution feeds) occurs in the background and the only time your engineering team must be concerned is when something goes wrong. Here you are optimizing human productivity because your technical team need not worry about what’s working correctly – their focused attention is directed toward quickly resolving errors. That’s why media companies need monitoring.



### Monitoring By Exception Before Diving Deep

When it comes to monitoring by exception and subsequently digging deeply into a problem, Telestream offers a complete solution. We begin with the Inspect 2110 probe to automatically look for anomalies and continue with PRISM to diagnose them. We deliver a complete solution to the monitoring and troubleshooting needs of content creators, producers, and broadcasters by coupling the probe and the advanced diagnostics tools into a seamless user experience. The result is a complete system for managing and maintaining today's increasingly large and complex media networks.

Consider, first, the probe. Here we monitor all, or any subset, of the signals in your facility, and the user interface displays a thumbnail video. Each thumbnail is paired with a Red/Green status indicator. By quickly looking at the UI, the user can immediately determine whether signals are functioning properly (Green) or not (Red).

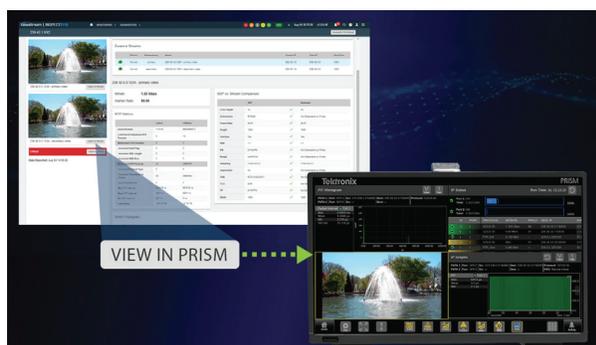
Of course, you are not just supplying video content. You also deliver one or more channels of audio, and ancillary data. So, to avoid having to examine each essence type separately, video, audio, and data essence from the ST 2110 streams are combined and the Red/Green indicators aggregate the status of the whole collection. The problem becomes one of wrangling that data and bringing it under control. A probe like Inspect 2110 does that while also providing alerts that allow the operators and engineers to zero in on specific issues.

If a signal, or group of related ones, is "red", the user can instantly list the associated alarms by hovering the mouse over the small moving image that represents it. Immediately, you are focusing on signals or groups that have issues instead of overwhelming the user with monitor walls full of images and data. Within virtually every network packet resides a wealth of information related to each bit of essence. Accessing and correlating that data quickly is vital to fast remediation. A secondary advantage is the ability to log alarms that can easily be sorted such that, over time, it is easy to see the timestamp of alarm occurrences, as well as error duration and more. This simplifies the processes of trend analysis and of identifying recurrent problems.

### Taking the Deep Dive When You Must

Monitoring by exception is the first piece of the puzzle but being able to make a seamless transition to a more sophisticated IP and media diagnostics tool is what makes our solution complete. For example, when Inspect 2110 has identified an issue it provides several tools that you can use to diagnose the problem. But, when the time comes to deeply dive into issues like primary and secondary stream mismatches, buffer over- and under-flows, and PTP problems, you need additional tools.

To make accessing those tools seamless, Inspect 2110 provides a quick "View in PRISM" feature that allows the required information relative to the program streams to be directly configured to a specified PRISM.



This simplifies configuration and allows you to swiftly investigate the issue using a wide array of diagnostic tools. Without the “one-click” interface you’d need to write down, from the probe, all of the details of the stream(s) that you must dive into and then manually set up the network configuration or routing on the PRISM via NMOS. That is additional work and is prone to errors.

With PRISM as your diagnostic tool, an operator or engineer can investigate further by simply selecting the stream or bundle of essences and clicking a button labeled “view in PRISM”. The PRISM will automatically be configured to explore the selected stream(s), saving configuration time and guaranteeing that mappings exactly match the monitored stream(s).

Once Inspect 2110 sends a problematic ST 2022-6 or ST 2110-20 video stream, an ST 2110-30 audio stream, and/or an ST 2110-40 ancillary data stream (or a bundle thereof) to PRISM we decode it/them and can diagnose problems deep within the video, audio, or data through PRISM’s IP analysis tools. This allows live monitoring of signals and uses tools like the IP Status and IP session apps to explore and validate the syntax of the streams in question.

Other graphical plots, as well as PIT histograms and timing measurements, help diagnose issues in detail.

This can take time, but a significant driver of efficiency is that the alarm indications provided by Inspect 2110 allow your technically savvy engineers to focus on specific issues instead of watching monitor walls. The result? Time-to-resolution efficiency.

Telestream provides several resources related to monitoring by exception and seamlessly transitioning to IP diagnostics. The Telestream Inspect 2110 system can watch for problems so your high-value engineers don’t have to. When notified, they click one button and begin diagnosing with PRISM. It’s a total solution that makes you more productive. Take the opportunity to learn more, contact us, and get a live demo.

To learn more about Inspect 2110 and monitoring by exception visit our webpage [here](#).

To learn more about the PRISM Media Analysis Platform and the whole Waveform Monitor family [click here](#).

Ready to talk to us and see it in action? [Contact us today](#).

