Tresent Technologies' IPQ-1000

User report

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In moving television signals from a baseband physical layer to a digital/IP/cloud based infrastructure, the technology of monitoring and testing the 'signals' (now no more as streams), needs to change as well. The baseband physical layer systems will now become islands for local production and distribution within the television physical plant and to the consumer is in the form of compressed digital.

Broadcast to the home is comprised of a variety of networks first the RF serving a community 'Over-The-Air'. Other distribution networks serving our viewers include cable TV, satellite and fiber to the home.

The concern of this report is found in a need for testing and monitoring the compressed streams. The DVB-ASI standard for multiplexing broadcast programs streams has been in place for many years and is the de-facto standard for distributing our multicast program streams from the production studio, through the studio transmitter link and on to the transmitter site, where it is converted to 8VSB for transmission (note other worldwide systems use the DVB-ASI standard and alternate RF systems).

Recent development has produced various standards for moving DVB-ASI over IP, therefore enabling interface of broadcast streams into an IP network. This protocol has proven very effective in moving the broadcast DVB-ASI stream from the physical plant over common carriers to cable TV and satellite distribution networks.

FIGURE 1 IPQ-1000 Media Stream Analyzer

FIGURE 2, Connector Surface, Gig-E and DVB-ASI loops

In looking for a tool to verify DVB-ASI in both transport stream and IP, I found the Tresent IPQ-1000 (aka "IPQ"). The IPQ is very portable, does not require any outboard hardware, and analyzes both ASI and IP streams. Traditional stream analyzers are usually found in the form of an I/O card in a PC or a laptop with a USB device; either running software driving the ASI interface device. The form factor of these devices are not usually 'really portable'. The IPQ is powered by a battery or conventional 120 VAC. It can be connected to any hardware in the facility directly, the back of a rack, IT closet etc.; or moved easily to the transmitter facility or local CATV headend.

Investigating the IPQ's Features: DVB-ASI STREAM & TABLE DATA

Table Information is vital for identifying the contents of the transport stream and elements of programs embedded in the stream. The hierarchy of labeling individual types of information with a PID, then mapping related PIDs into a program is common in all worldwide television standards. Using the IPQ, a technician can quickly verify the content of the stream under test and its program structures.

The IPQ has a touch screen making manipulation of menus very simple. Selecting the Tables tab on the IPQ, initially presents a list of the top hierarchical level tables (example the MGT or TVCT and their PIDs see Figure 3B) is displayed. Touching the top level table listing enables drilling down to the next level where the table's details are found as seen in Figure 3A and 3C.

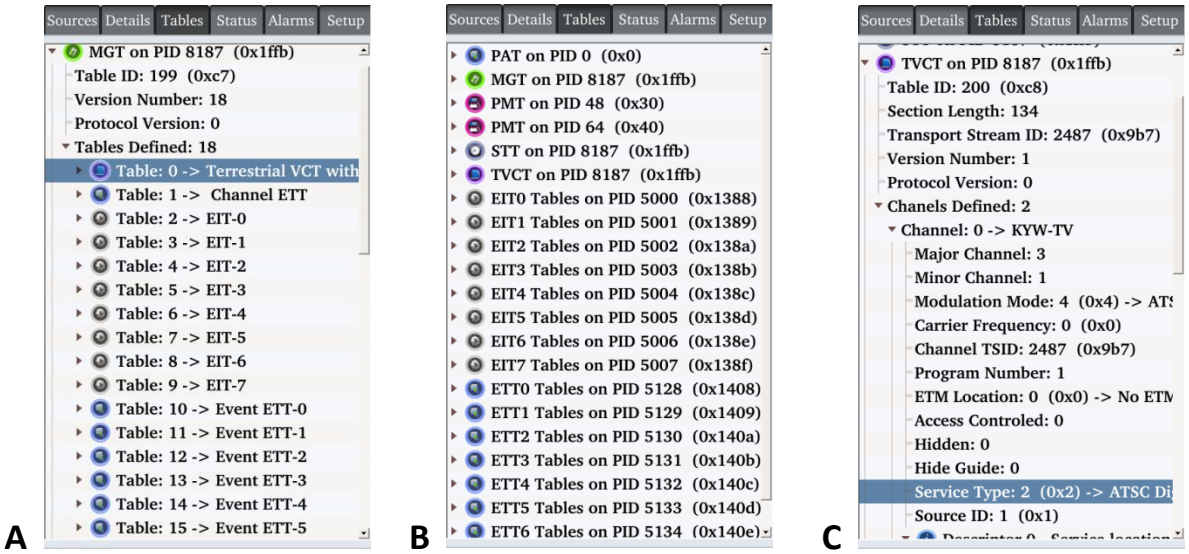

FIGURE 3 Table Examples: Left (MGT) Center (ALL) Right (TVCT)

From a system engineer's point of view, an essential measurement is the bit rate of each PID, each program, and total stream bit rate. Nearly every commercial and non-commercial station today emits a multi-program stream; per ATSC (& FCC) standards the total stream bitrate cannot exceed 19.4Mb/s. The IPQ measure and displays in both its Details Screen (Figure 4A) and Sources screen (Figure 4B). This measurement is used when verifying the configuration of the broadcast encoders and stream multiplexor.

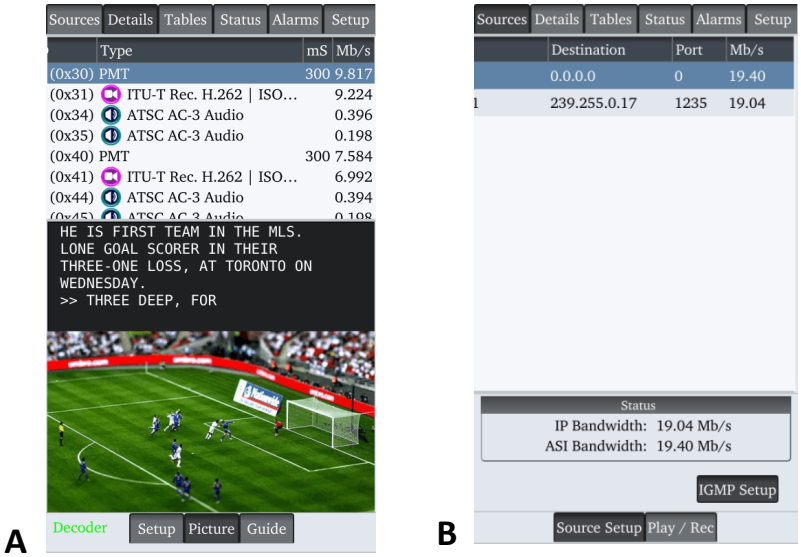

FIGURE 4 Bit-Rate Examples: Left Program Right Stream

Investigating the IPQ's Features: DECODING PROGRAM DATA

The real power of the IPQ is found in its ability to decode the content. Current regulations require that program producers add captioning to the metadata of the program stream and program distributers pass though all closed caption information. Additionally, in the real world of content distribution cable TV systems et-al can provide HD programming and simultaneously down converted programs into various tiers of their distribution network, i.e. SD tier for compatibility to legacy receivers, HD tier for viewers with current technology in their living rooms.

In down converting the video data, the program distributers are essentially decoding compressed streams converting the video data and then re-encoding the video into a different format. During this conversion process, the possibility of mis-placing metadata exists.

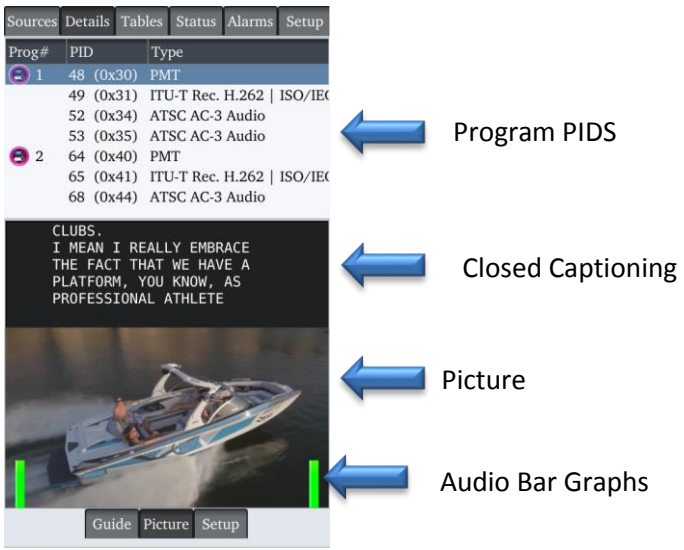

FIGURE 5, Details Screen

The IPQ's 'Details' screen simplifies verification of stream information and is seen in Figure 5. The information displayed in the Details Screen is essential and required to distribute content; closed captions, audio, picture and table data.

For example: a technician troubleshooting (or providing quality assurance) any media stream will find that this single display provides instant verification of the essential content for each program in the stream (the touch screen helps to simply navigate from one program to another). Just as he would use the IPQ to verify program and total bit rate, he uses the IPQ to ensure the subjective quality of the picture and sound. These measurements can be made in the broadcast facility and further downstream at the cable TV headend.

Investigating the IPQ's Features: ALARMS, LOGGING and STREAM RECORDING

For more in depth system wide troubleshooting, the IPQ include both a stream record function and logging of alarm information. When the IPQ is deployed to capture 'long term' analysis of a broadcast stream, it can be installed directly into the circuit under test. The looping input feature allows the IPQ to become an in-circuit 'monitoring node'.

Referring to Figure 2, the IPQ has 'loop-through' inputs for both DVB-ASI and Gig-E. Connecting the IP in circuit does not require any additional hardware while providing the information about the actual stream under test. For this application the IPQ may be placed in an IT closet and used to monitor in-bound or out-bound streams while creating and logging alarms.

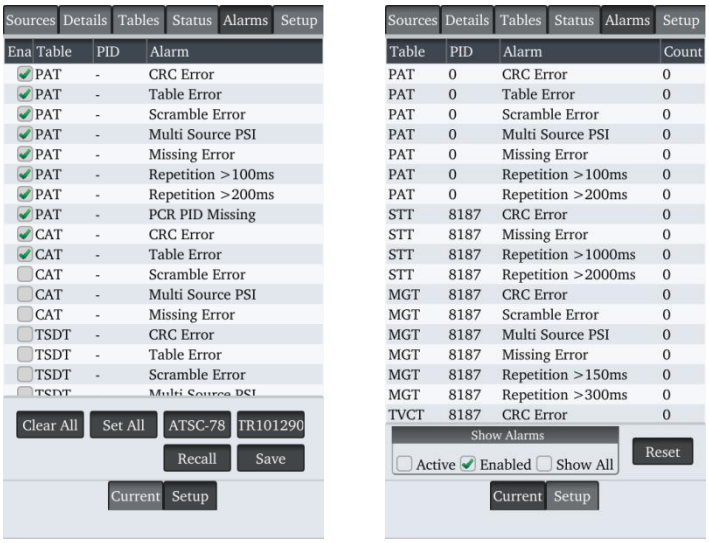

FIGURE 5, Alarms Set-Up and Alarms reporting Screens

Figure 5 shows the Alarm Setup and Alarms reporting screens. The Alarm Setup screen allows the user to enable alarms independently and as required. The technician can create customized alarm settings to pinpoint a problem quickly. The Alarm reporting screen then shows currently occurring problems or a log of alarms captured over time. As mentioned earlier, the IPQ's touch screen makes navigation simple and efficient.

FIGURE 6, Stream Recorder Screens

The IPQ has transport stream recording capabilities. This feature was found to be very important. As the IPQ will be used by many field technicians, they may not always understand the entire complexity of the stream. Also for troubleshooting intermittent issues recording the stream is very helpful.

Having a stream recorded deployed in the field allows the technician to take a snapshot of a stream under test, then use the recording in a more sophisticated environment for more in depth analysis of issues. Additionally using the IPQ to troubleshoot an intermittent issue gives the technician an edge in determining the exact source of problems quickly and efficiently.

SUMMARY:

Tresent's IPQ-1000 is a feature rich measurement instrument for todays compressed and file based environments. Offering both DVB-ASI and Gig-E interfaces enables this product to be useful in all modern broadcast, satellite and CATV facilities and networks. The 'IPQ' is extremely simple to operate, lightweight and capable of field, studio and headend operation. The IPQ offers displays of Tables, Decoded Video, Decoded audio, Closed Captions, Bit Rates (PID, Program & Stream), Alarms, Logs and Stream recording in a convenient package, AND it will not kill your budget!