Volicon Observer™ RPM

Remote Program Monitor

Post STB-Monitoring, Logging and Troubleshooting

Pay-TV operators are caught in a hyper-competitive marketplace. They must provide a growing array of linear, on-demand and interactive video services, maximize customer quality of experience (QoE), all while minimizing costs. The operators are challenged amid the growing complexity of the service, network, and STB infrastructure needed to deliver these new services. Knowing the head-end is good but is not enough any more.

Based on technology employed in Volicon's award-winning Observer broadcast monitoring system, the Observer RPM allows operators to monitor hundreds of channels, troubleshoot real time video issues and verify broadcast content and ads in a 24x7 log. The Observer Remote Program Monitor (Observer RPM) is for Pay-TV operators that need to remotely know the customers' experience. With its 24x7 recording and proactive monitoring of linear, on-demand and interactive services, with streaming of live or recorded video, the RPM allows operators to identify problems before customers do, troubleshoot problems quickly and easily when problems do arise and avoid costly chronic trouble- shooting sessions.

Key Benefits

- Simple to setup and use
- Proactive detection of outages
- Assurance of all video services
- Real knowledge of customer experience
- Improved troubled shooting time
- Enhanced customers' retention

Key Use Cases

- Proactive Monitoring of Video Services
- Ad or Program Verification
- Real time troubleshooting
- Chronic troubleshooting
- Providing visibility of MPEG impairments
- Comparing content from ingest through the edge

RPM Solution SW

- Post-STB monitoring, logging & troubleshooting
- SD and HD: HDMI, Component, Y/C, Composite
- Channel scanning or real time troubleshooting
- 24x7 A/V recording for 7 days
- LAN/WAN Video Streaming – live or recorded
- On-screen Virtual Remote Control
- Low to High density : 1-4 inputs in 1RU
- Custom thresholds with SNMP/email alerting

Module System & HW Requirements

- RPM probe & central server hardware
- RPM central server application
- STB IR Control & A/V Cabling

Observer RPM How it works

A network monitored with the Observer RPM has four main elements

1. RPM Encoder Probe

Deployed at key handoff points in the network, the encoder probes independently control 1, 2, or 4 STB inputs to monitor video service quality. The probes use IR to control the STBs and monitor HD or SD A/V content over composite, S-video (Y/C), component or HDMI interfaces. The individual STB inputs are used to scan through a channel lineup, periodically testing linear, on-demand or interactive services, perform scheduled recording of advertising or other high value content or be operated in an interactive mode for real time troubleshooting. By recording the incoming A/V content 24x7 for 7 days, the RPM provides an accurate record of the customers' experience. This continuous, full frame rate log can be used to help avoid chronics, accelerate troubleshooting and provide proof of ad delivery. The RPM utilizes reviewer functionality to allow the probe to isolate faults caused by the STB from faults that are present in the service or network elements.

2. RPM Central Server Function

The central server function can be hosted on one of the encoder probes for small deployments or on separate server hardware for larger deployments. The central server function provides for a single user sign-on and centralized probe administration, the web user interface, centralized fault and status view and hosts the common system database.

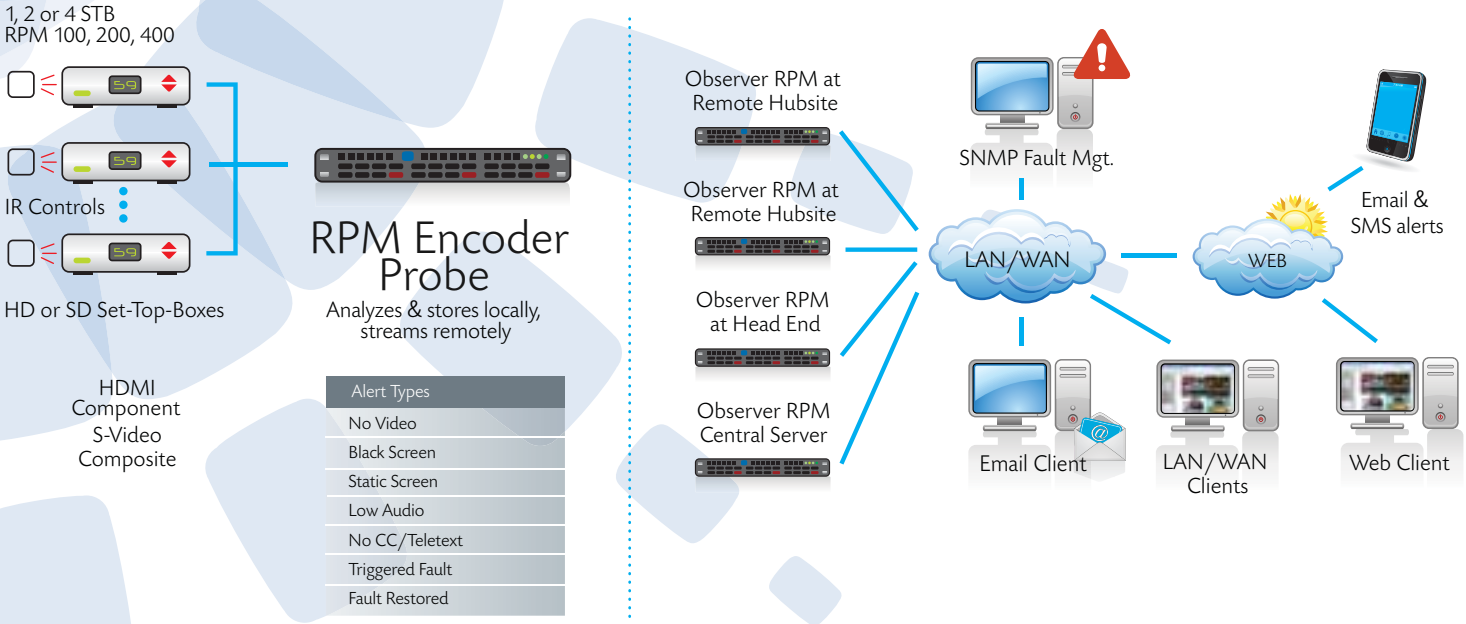
3. Web Client

Client machines launch the RPM web interface to access the live or recorded content in a LAN or WAN. Because the system uses retransmissive TCP video streaming directly from the probe to the client, the user is able to reliably watch streaming video over LAN, WAN or the internet.

4. Alert Management

While the central server provides an easy source for reviewing and troubleshooting all faults, the RPM also sends fault notifications over email, SMS, or SNMP.

Observer RPM System Architecture



Observer RPM Key Use Cases

The RPM may be deployed in many different use cases for Pay-TV operators.

Proactive Monitoring of a video services (lineup) – This is the primary use case of the RPM. By programming the RPM with a channel lineup and thresholds customizable by service and time of day or day of week, the RPM is able to quickly scan through the channel lineup and verify 100's of channels per input. The RPM can scan linear channels and, with the addition of the interactive services module, can also test on-demand and interactive services that may require scripting of commands or graphical pattern matching to test. This automated monitoring allows the operator to identify outages before the customers complain, improving service levels and reducing help desk loads.

Ad or Program Verification – By utilizing the scheduled recording feature, the RPM encoders can be repurposed at select times to change channels and then record and perform A/V quality checks on ad insertions or high value programs. The system allows for easy clipping and exporting of the full motion, full frame rate A/V assets recordings of the A/V assets for troubleshooting or proof of delivery.

Troubleshooting video services real time – By utilizing the manual/remote mode, users are able to stream live video and control the STB with all the buttons on the virtual on-screen remote control or customizable scripts. This enables operators to continuously monitor the health of video services and easily troubleshoot problems.

Troubleshooting chronic problems – By utilizing the logging recording capability of the RPM, providers are able to have a continuous record of the customers' experience. When chronic problems arise, the operator is able to share an A/V record of the impairments, helping to more quickly troubleshoot and isolate the cause of the fault.

Providing visibility of MPEG impairments – By utilizing the triggered recording in the Proof of the Experience module, operators are able to utilize the RPM to provide a visual proof of experience around MPEG impairments. Utilizing SNMP alerts from an MPEG Transport Stream Analyzer, the RPM dials a channel and provides an A/V clip around the MPEG impairments. This clip allows operators to focus their efforts on impairments affecting the customers' experience, raising service levels and saving technician dispatch costs.

Comparing Content from Ingest to the Edge – If RPMs are deployed at network ingest, local hub points and at the edge of the network, the operator can quickly synchronize the probe views and isolate problems, current or historical/chronic, quickly and easily. In response to a trouble, the operator can bring up an affected edge probe, one at the associate hub, head end and one at network ingest. The probe views then are synchronized to the time of the reported fault and the operator obtains a real record of the resultant customers' experience at each location.

Observer™ RPM

OBSERVER RPM Specifications

Feature	RPM-100-SD	RPM-200-SD	RPM-400-SD	RPM-100-HD	RPM-200-SH	RPM-400-SH
Simultanous A/V Inputs*	1	2	4	1	2	4
Input Type**	1 SD	2 SD	4 SD	1 HD	1 HD + 1 SD	2 HD + 2 SD
Maximum Input Resolution	720x576	720x576	720x576	1920x1080	1920x1080	1920x1080
Maximum Logging/ Streaming Resolution	720x576	720x576	720x576	1280x720	1280x720	1280x720
Operating Temperature	10°C-35°C	10°C-35°C	10°C-35°C	10°C-35°C	10°C-35°C	10°C-35°C
19" Rackmount Chassis Height & Maximum Depth	1RU 25.6"/66cm	1RU 25.6"/66cm	1RU 25.6"/66cm	1RU 25.6"/66cm	1RU 25.6"/66cm	3RU 30"/76cmy
Weight	38lbs/17.2kg	38lbs/17.2kg	38lbs/17.2kg	38lbs/17.2kg	38lbs/17.2kg	45lbs/20.5kg
Swappable Power Supply	No	No	No	No	No	Yes
RAID Swappable Storage	Yes	Yes	Yes	Yes	Yes	Yes
Power Requirement (100V-240V)	560W	560W	560W	560W	560W	560W

Note: * SD units are assumed to log and stream at 320x240, 512 kbps, HD inputs at 800x450, 1.5 Mbps. Other settings are available.
** SD inputs are Composite, S-Video or Component, HD Input Types are Component or HDMI without HDCP.

Standard on all units

- Ability to host central server function for up to 5 other probes
- Dual LAN connections
- Serial over LAN, IP KVM, and watchdog module for remote management.
- IR emitters for STB control
- Windows operating system
- 7 days of storage per input

Other SW

RPM Central Server SW – The Central Server function is required to deploy RPMs. This functionality can reside on the same HW as the RPM for small scale deployments (<6) or can be hosted on separate HW. It provides web presentation, centralized database and configurations along with user administration and probe maintenance functions.

RPM SW Modules

Interactive Service Module – By incorporating powerful scripting, enhanced decision making and graphical pattern recognition, this module enablesthe RPM to reliably test complex interactive and on-demand service

Scheduled Recording Module – This module enables the RPM to be directed through an xml schedule import or through a GUI or user interface to continuously record content at specified date/ time/channels.

EPG Import option for Scheduled Record – This option on the scheduled record module enables operators to import the EPG directly into the RPM system to enable an Electronic Program Guide GUI to drive recording operations.

Proof of Experience/Triggered Record Module – This module enables the RPM to integrate to MPEG transport stream analyzers for purposes of recording content that has MPEG impairments. This enables the operator to have a record of the customers' experience around MPEG impairments.

HW Options

RPM Central server HW – This is the server HW needed to host a central server that can handle up to 200 RPM probes.
Set-Top-Box Mounting Shelf – This 2RU holds the STB and the IR emitter in a mechanically solid, optically isolated manner to enable reliable operation.

IP Controlled Power Switch – This power switch provides the RPM the ability to execute hard reboots on the STBs by cycling power.

Observer RPM 1RU

Observer RPM 3RU

Volicon

Volicon, Inc. 111 South Bedford St., Burlington, MA 01803
Tel: +1 781 221 7400 Fax: +1 781 221 7407
Web: www.volicon.com E-mail: info@volicon.com

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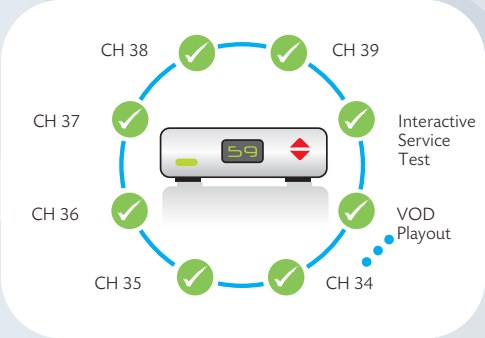
Volicon Observer™ RPM

Modes of Operation

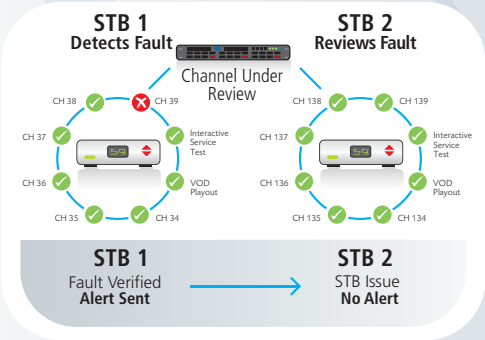
The RPM's encoders can operate in several different modes for the operator. The RPM is continuously logging while in all these modes, enabling easy reviewing or sharing of content.



Scanning

– Linear, On-demand and Interactive Services

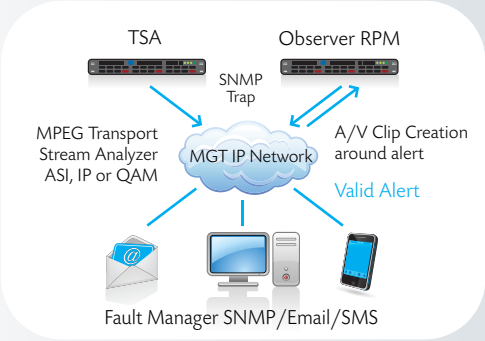
The RPM is programmed with a lineup of linear, on-demand and interactive services that need to be continuously monitored. The RPM then automatically sends the IR commands to the STB to dial the linear channel or activate the on-demand or interactive element, and then analyzes the A/V content and metadata for Black Screen, Static Screen, Audio Levels, loss of video, or absence of captions or teletext. When an impairment is detected, a reviewer operation (see below) is performed and, if the fault is verified, email, SMS and SNMP alerts are generated along with a full frame rate A/V clip of the actual impairment for easy review. Interactive and on-demand services are able to be included in the lineup with the addition of the Interactive Services Module which includes scripting and image pattern matching libraries to reliably navigate and automatically test these features.



Reviewer Operation

– Separate STB from Service Faults

Because the RPM measures the customers' experience after the STB, the system also detects faults that are caused by and localized to one STB. After detecting an impairment in the automated scanning operation, the RPM verifies the fault with an adjacent, independent STB before sending the alert. STB faults that are not verified do not generate an alert but do enter a log for easy review. If an STB is detected as persistent, falsely identifying faults, the RPM may be configured to perform a soft or hard reboot of the STB to eliminate this problem. This reviewer operation enables the operator to be sure the alerts generated by the RPM are valid while also providing a true window into the customers' post-STB experience.



Triggered Recording

– Integration with MPEG Analyzers

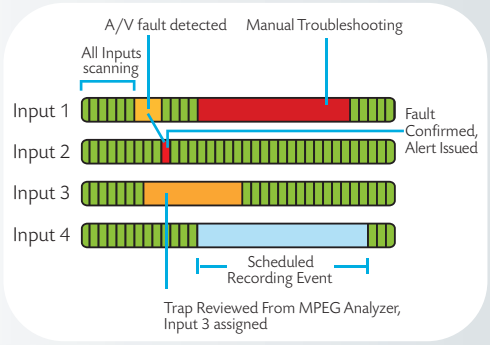
With the Proof of Experience Module, the RPM encoders may also be directed to dial and analyze a particular channel because of impairments detected by a co-located MPEG analyzer. The MPEG Transport Stream analyzer is setup to send SNMP alerts to the RPM system along side the normal fault management destinations. The RPM then parses these traps, dials to the appropriate channel and records the MPEG impairments. An adjustable dwell time allows the scanner to automatically stay on a troublesome service to catch even intermittent errors. In this mode, the RPM's post-STB recording can provide a true record of the customers' experience associated with the MPEG impairments.

Scheduled Recording
– Ad Verification & Program Record

While not performing live troubleshooting, the RPM can be tasked to record particular high value programs or advertising content. Whether driven from an XML schedule file or an EPG GUI selection, scheduled recording allows the operator to establish channels and time periods to stay on one service and record it continuously. This content is monitored for A/V impairments while the system creates an easily viewable and exportable clip for archival or forwarding purposes. With adjustable pre-roll and post-roll time, the RPM provides operators an easy tool to ensure the complete capture of an ad or program while the 24x7 full frame rate recording enables examination of ad insertion performance down to the frame level. Finally the As-Run-Log from the program or ad insertion system may also be imported into the RPM system creating an easy tool to provide advertising verification and reconciliation.

Manual Mode
– Live Troubleshooting with Remote Control

In this mode, the user can watch live content, dial channels or activate on-demand or interactive features. Because the RPM is recording 24x7 at up to full frame rate and resolution, the user is able to clip and easily export A/V content to share with others. At any point, the user can pause, rewind or even step through the video frame by frame in the window or full screen. The multiview window and synchronization mode allows easy comparison of the content at different locations from the head end to the edge. This mode is frequently used to perform on demand continuous recording of a chronic or high value program.



RPM-400 in Operation
– All Modes in One System

Shown here is how an RPM can multiplex all of these modes in one probe system. By utilizing multiple STBs attached to the one probe, the RPM is able to operate in manual mode, perform scheduled recordings, capture MPEG errors and even do normal service scanning and reviewing all in one tool. By allocating resources and setting priorities, the RPM is able to address critical needs while still performing proactive monitoring when resources are available.

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