Enabling Australia's Field Technicians to build, troubleshoot and maintain better communications networks.

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Volicon
Observer RPM

The Observer RPM (Remote Program Monitor) is Volicon's solution for MSOs, Independent Cable operators, IPTV, and Satellite providers looking to automatically evaluate the quality of their NOC/headend and remote hub site broadcasts from a central location.

Based on technology employed in Volicon's award-winning Observer broadcast monitoring system, the Observer RPM scans hundreds of channels, automatically testing signal integrity around the clock and issuing alerts (via email and SNMP) when scanned channels do not conform to pre-specified limits. Monitoring includes detection of low audio levels and missing/frozen/black video, including notifications when the signal is restored. Supported transport stream analyzers may also be integrated.

In addition to providing alerts, the Observer-RPM can record content for later review, facilitating diagnostics by allowing technicians to carefully observe an intermittently faulty channel. Armed with a standard MS Windows-based PC, one technician is capable of reaching out and inspecting the entire video pipeline – from central headend to remote hubsite – without leaving his or her seat.

The Observer-RPM eliminates the need for manual, visual channel inspections – an expensive and time-consuming task. It allows proactive response to faults, instead of waiting passively for customer complaints. Improve service and save on operating costs by eliminating unnecessary service trips to remote locations.

- Automatically monitor the entire channel lineup
- Identify and evaluate severity and cause of failure, often
- obviating the need to send a technician to a remote site
- Alert generation when faults are detected and confirmed
- Record problematic channels 24/7 for closer scrutiny
- Stream desired channels for remote viewing from any location
- Log and rewiew faults via web interface

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Central Monitoring

Scan Channels
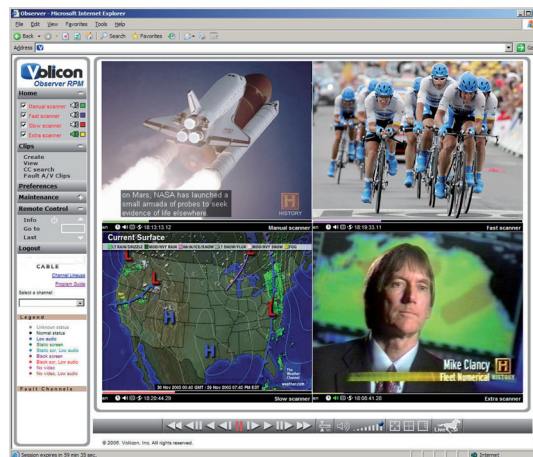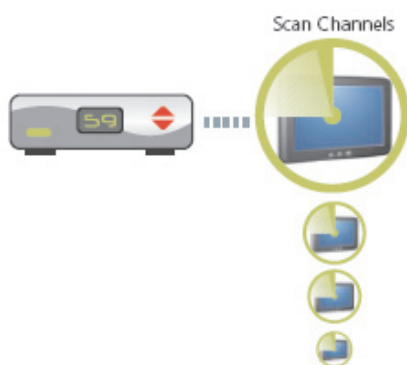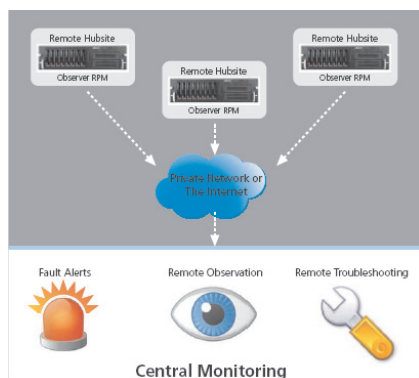
Overview

An Observer RPM monitoring network consists of RPM servers, situated wherever monitoring is desired (usually remote hubsites). At minimum, one RPM server is necessary for each distinct monitored location. Each RPM server is designed to control and inspect the output of several set-top boxes. Each set-top box is attached to one composite video input, and is controlled by means of a programmable infrared emitter, configured to mimic the set-top box's original remote control.

Once attached, each input on the RPM can be configured in one of four modes:

- Fast Scan: the attached set-top box will be instructed to scan the channelspace as quickly as possible, spending the minimum amount of time possible (typically 5-10 seconds) to inspect each channel. If a channel is found to be faulty, it is added to a list of "problematic channels" which a slow scanner will inspect, and an alert is issued.
- Slow Scan: the attached set-top box will be instructed to scan each channel in the "problematic channels" list for a longer duration (usually 1-2 minutes), carefully monitoring faulty channels for the return of normal service. If a faulty channel returns to normal, the slow scanner issues a "signal restored" alert and removes the channel from the problem list.

1. Scan

The Observer RPM controls the attached set-top boxes, quickly changing channels and evaluating each for faults:

- No video signal
- Black screen
- Static image
- Low/missing audio
- Shut-down set-top box

Multiple fast-scanners may be employed to speed up scanning.

- Manual: in this mode, the attached set-top box does not automatically scan the channelspace, instead it is remotely controllable via the Observer RPM's web interface. Operators may issue any series of remote-control keypresses to the set top box, including power on/off commands. A selected channel will be streamed in real time for remote viewing.
- Transport Stream: upon receiving a fault alert from transport stream analyzer, the Observer RPM will tune the attached settop box to the faulting channel, generate a fault clip, and issue an alert.

Any combination of these four modes may be applied to attain the desired functionality. Nominally, multiple fast scanners are used in tandem, each one scanning a subset of the channel list and thus reducing the amount of time between channel inspections. Once a fault is detected, a clip is generated depicting the faulty channel, and an alert is dispatched to operators via email or SNMP trap. Operators may then log into the web interface to see the clip and share it, and may use the manual tuners to diagnose the fault. Channel faults can be sorted by channel name/number, set-top box, and QAM to aid in diagnosis and reporting.

For central monitoring applications, an additional Observer-WEB server is needed at the central location to facilitate aggregation of the information from each Observer RPM machine in the monitoring network. The network-based alerting of the Observer RPM does not require any contact-closure wiring or installation, reducing complexity, maintenance, and equipment costs.
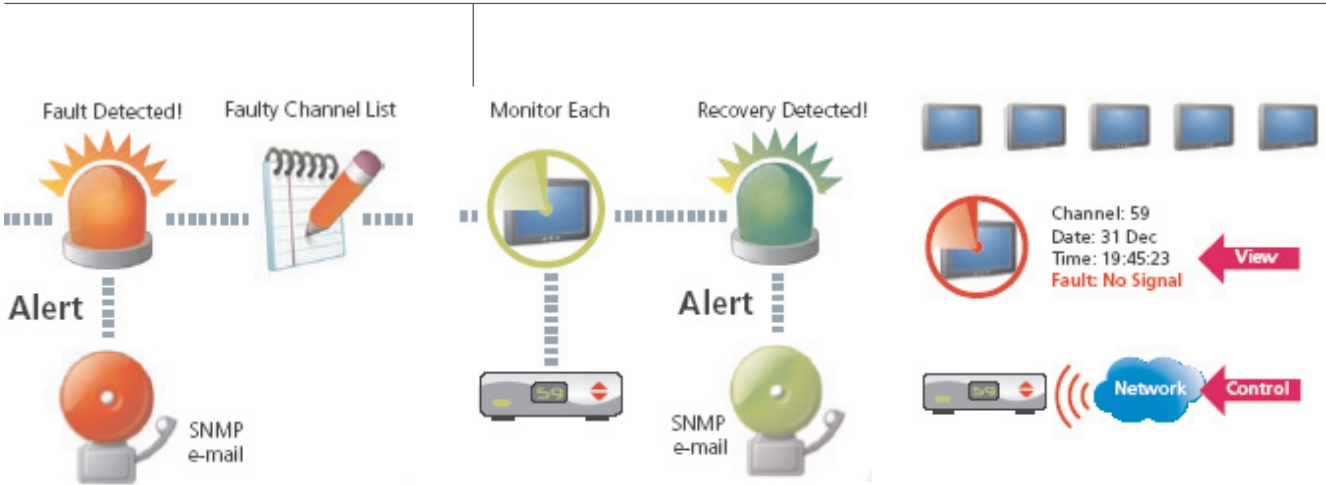
2. Alert

Once a fault is detected, an alert is issued to operators via SNMP or e-mail.

A 90-.second "fault clip" is logged and archived on the server.

The malfunctioning channel is added tothe faulty channel list.

3. Recovery

A slower recovery scanner rotates through the faulty channels, watching each for a return to normal functionality.

Once a recovery is confirmed for a channel, it is removed from the faulty channel list and a recovery alert is issued to operators.

4. Review

A slower recovery scanner rotates through the faulty channels, watching each for a return to normal functionality. Once recovery is confirmed for a channel, it is removed from the faulty channel list and a recovery alert is issued to operators.

Fault types view

Fault types

Alert type	Description
No Video Signal	Generated when the video signal is absent for a configurable duration.
Low Audio	Generated when the audio signal is below a configurable threshold for a specified duration.
Black Audio	Generated when there is a black screen for longer than a user-specified duration.
Static Video	Generated when there is a frozen image onscreen for longer than a user-specified duration.
Fault Restored	Generated when a faulty channel returns to normal.
Transport Stream Fault	Generated upon receipt of alert from supported transport stream analyzer.

Machine descriptions

The Observer RPM machines were designed with robust 24/7 unattended operations in mind. Every RPM machine features redundant power supplies, dual gigabit ethernet, and hardware RAID-5 with an extra standby "hot-spare" drive. In addition, each machine features an IPMI baseboard management for remote hardware status inspection (including SNMP traps) and remote rebooting.

Feature	RPM-200	RPM-400	RPM-800
A/V Inputs (analog composite) autoscanners	2	4	8
Channels scanned per minute	12	36	72
Central monitoring	Yes	Yes	Yes
SNMP alerting	Yes	Yes	Yes
Transport stream analyzer	Yes	Yes	Yes
Storage per input (days)	5	5	5
Storage redundancy	RAID-5 w/ hot spare	RAID-5 w/ hot spare	RAID-5 w/ hot spare
IPMI watchdog module	Yes	Yes	Yes
CPU	Single	Dual	Dual
Operating system	Win server 2003	Win server 2003	Win server 2003
Network	Dual Gigabit Ethernet	Dual Gigabit Ethernet	Dual Gigabit Ethernet
19" Rackmount chassis height	1 RU	1 RU	3 RU
Weight (lbs/kg)	45 lbs / 20.5 kg	45 lbs / 20.5 kg	90 lbs / 41 kg
Number of power supplies	2	2	3
Rated power requirements	560 W	560 W	760 W

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