



Summary of recent feature additions

Available in the new v5 firmware for aVS, aMS & QuBE systems

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v5 Firmware Feature Additions

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1 INTRODUCTION

This document provides a summary of recently-added features available within the new v5 firmware. It is not exhaustive – too much development work has been done to list every change – and can only provide brief information about each item. For further details of any aspect of the available functionality, please contact sales@aq-broadcast.com.

2 CORE HANDLING

There is a large amount of core handling which is common across the different firmware configurations. This ensures that functionality and capability provided for one platform is also available immediately for other applications.

2.1 RECORDING AUTO-COMMIT

If available storage capacity reduces to a critical level while recording is taking place – i.e. it appears that there won't be enough space to save the recorded file – the record process will be stopped automatically and content recorded up to that point will be committed to disk. It is not possible to start further records until sufficient capacity is available – e.g. by deleting or archiving existing content.

2.2 ASSET CONTROL TAGS

New metadata can now be entered to control access to clips, including Embargo (cannot be played in any form before the embargo date), Expired Warning (can be played after the expiry date but a warning is shown), Expired Inhibit (cannot be played after the expiry date) and Auto-Delete (will be deleted automatically once the specified date has been passed). Additional handling has been added to track the last time that each asset was 'touched', allowing unused or infrequently used items to be identified easily.

2.3 MPEG-2 ENCODER SUPPORT

Extensive work has been carried out on the MPEG-2 encode processing to ensure wider support by third-party applications. The MXF write process has been considerably improved, particularly for IMX/D-10, OP-1a and OP-Atom, and MPEG-2 XDCAM profiles now produce long-GOP content with correct parameters. Considerable testing has been completed to ensure compatibility with Avid Media Composer software.

2.4 MPEG-TS SUPPORT

A full-function reader for MPEG-TS files has been added, along with a Transport Stream data writer – allowing TS files to be recorded and played back.

2.5 AC-3 ENCODING

Support has been added for writing audio tracks in AC-3 format.

2.6 H.264 PLAYBACK

The ability to seek using H.264/H.265 SEI recovery points in addition to keyframes has been added.

2.7 WAVE FILE WRITER

It has always been possible to play .wav files, but the new capability to write Wave content (supported for all normal operations, including capture, transcode, sub-clip, etc.) means that audio-only clips can be recorded directly for the first time.

2.8 SD WIDESCREEN SUPPORT

Support for SD widescreen format has been extended, allowing the Sequence Conform process to generate content in the either 4:3 or 16:9 based on the edit profile settings.

2.9 VBI / CEA-608

The VBI generation algorithm for CEA-608 closed captions in line-21 has been extended. This relates to generation of an analogue VBI waveform, corresponding to that used by analogue NTSC composite video signals, which is then virtually digitised to provide samples to emit in SD-SDI signals. This emulates a “dumb” SD-SDI digitiser processing an analogue NTSC signal.

2.10 VANC / CEA-708 DOWN CONVERSION

Conversion from CEA-708 captions to CEA-608 is now supported (by extracting the 608-compatibility bytes). When splitting VANC to extract CEA-608 captions, CEA-708 CDP compatibility bytes are used if no CEA-608 packet is available. This allows down-converted playback of MXF with S436m HD captions on SD ports, with regenerated CC.

2.11 VANC / CEA-608 UP CONVERSION

CEA-608 to CEA-708 up conversion has been added, allowing playback of SD files with captions on ports configured for HD and CEA-708.

2.12 RTMP CLOSED CAPTIONS

Handling for RTMP closed caption encoding has been extended, allowing CC delivery within H.264 SEI and as onCaptionInfo(708) messages, and with particular handling for ATSC A/53 embedding.

2.13 SUB-CLIP PROCESSING

The processing of audio for sub-clips has been extended. It is now possible to specify a silent period at the end of the clip, between fade-down and out-mark, and also an option to specify that fade-out and silence should be applied after the out-mark instead of before it (lengthening the emitted clip).

2.14 NATIVE NETWORK STREAMS

It is now possible to send an output from one aVS/QuBE server directly to the input on another over a network connection – without requiring a physical SDI connection. This provides an effective way to distribute content within or between locations using a built-in (and configurable) IP transport mechanism. This proprietary handling is in addition to the support for the third-party NDI™ support described in a separate section below.

2.15 SUPPORT FOR REMOVEABLE DRIVE DOCKS

Additional export functionality has been added for external hard drives. It is specifically designed for fast transfers to removable hard drives in a SAS-attached bay but integrates with any removable disk device including USB.

2.16 WATCH FOLDERS

Some processing (for instance transcode-from-file) has been upgraded to use folder-watch handling in order to use content with multiple file elements (such as MXF OpAtom) properly as a source.

2.17 AUTOMATIC CONTENT DELIVERY

The processing between multiple aVS Stores, and between the overall storage and a Tx-Chain (transmission) server has been extended to enable automatic delivery of media content to the correct location for playout. This includes handling to ensure the selection of the correct asset – i.e. the local version, rather than one on a remote Store.

2.18 AUDIO LEVELLING

Two forms of automatic audio levelling have been added. One (primarily for aVS systems) reviews each new clip added to the Storage to establish the average audio level within the content, in order that the output level can be altered, automatically and to the appropriate level, whenever the clip is played back. The other (primarily for QuBE systems) provides best-effort dynamic processing in order to keep audio levels for the defined input within the configured range.

2.19 VNC DISPLAY SERVER

It has long been possible to access the server's screen remotely via VNC. This capability has now been extended to provide support for a wider range of VNC Clients (including the built-in capability available on OSX platforms) and, subject to hardware and configuration, the ability to allow multiple simultaneous connections from different remote machines.

2.20 EXTERNAL PDU INTERFACE

A new interface for APC Power Distribution Units (PDU) has been added, allowing power to external hardware to be reset remotely when required.

2.21 EXTERNAL TEMPERATURE PROBE INTERFACE

A new interface for USB temperature probes has been added, allowing temperatures to be monitored remotely.

3 AVS – VIDEO SERVER

The aVS platform provides video ingest, storage and playout capability – for instance as a 'conventional' video server.

3.1 VIDEO CLIP AUDIO PLAYOUT

Clips which contain both video and audio can now be played out on ports which are configured for audio-only – for instance to allow video clips edited for television to be used for radio playout as well.

3.2 MULTI-PORT 'NUDGE'

It has long been possible to link multiple ports together, for instance to play different clips simultaneously, managed by a single set of transport controls. It is now possible to 'nudge' individual ports back or forth relative to the others during playback. This allows synchronisation between outputs to be restored, for instance if the edit process has not been exactly frame accurate.

3.3 TRANSPORT CONTROL ONLY ('TCO') PROTOCOL IMPLEMENTATIONS

Full implementations of the VDCP and AMP remote control protocols have long been available. These assume full 'ownership' of a port – the remote system handles all management with no interaction from a local user – however this may not be appropriate in every situation, for instance if the remote system only provides a limited implementation of the protocol commands or if workflow requires that some actions, e.g. loading and cuing the required clip, are carried out by an

operator. To address this, TCO options have been added for both VDCP and AMP integrations, providing shared access to a playout port for both user and remote system. Most transport operations (play, pause, recue, rewind, fast forward, etc.) are supported for remote control, but loading / ejecting clips will be handled by the local user. The TCO drives will never change port mode (whereas full implementations can, in principle, switch function between recorder and player) but do function in Player, Playlist and Sequence modes.

3.4 PORT PROFILES

New port profiles allow different port configurations (e.g. input and output signal formats, record profiles, etc.) to be saved and subsequently restored. This enables fast conversion of the server from one configuration to another, for instance in a hire facility, where different cameras are used for different projects.

3.5 GPI RECORDING CONTROL

The existing GPI handling has been extended to allow recording to be started and stopped via external triggers – either one trigger for start and another for stop, or a single input going high to start recording and going low to end recording.

4 QUBE – BROADCAST ENGINE

The QuBE (aQ's Broadcast Engine) runs a particular firmware configuration involving “v-pipe” for production purposes plus, where appropriate, “Tx Chain” for MCR/Transmission applications.

4.1 VISION MIXER

A new Vision Mixer processor has been added to the v-pipe process within the QuBE, providing extensive and flexible support for studio production. Previously this functionality was only available within the Production Suite (aPS) platform – the migration across into the QuBE enables a single server to fulfil a wide range of requirements, particularly studio production.

4.2 AUDIO MIXER

A new Audio Mixer processor has been added, complementing the introduction of the vision mixer capability.

4.3 INTERNAL RECORDER

The internal record process has been updated, with support for fixed-duration recordings and start/stop events based on specified times.

4.4 STILL STORE

A new Still Store processor has been added, providing easy selection and playback of stills for production purposes.

4.5 VIDEO SLATE

A new Video Slate processor has been added, allowing a specified clip to be loaded and played automatically in a continuous loop – for instance to provide a source (perhaps with a generic promo or locator) for use in an emergency or as a filler.

4.6 TX-CHAIN AUTO-RESTART

Automatic restart handling – the process to select and initiate the correct item within a transmission schedule – has been significantly extended, including the ability to synchronise across parallel transmission servers.

4.7 TX-CHAIN MEDIA CACHING

The Tx-Chain handling has been extended to allow appropriate media (which will be required for playout within a defined period, based on the current transmission schedule) to be cached in a local storage automatically. This provides an alternative to the normal mode, where content is played from a common central Store.

4.8 TX-CHAIN EMERGENCY MODE

A new 'emergency work' mode allows an operator to instruct a transmission server to cache appropriate media, in order for content to be available locally rather than from a central Store. This allows a central Store to be shut down for maintenance, for instance.

4.9 ROUTE SELECT EVENT

This new event type allows router control (i.e. change to a specified source for a particular destination) from the transmission schedule.

4.10 DSK STAGES

The number of downstream keyer ('DSK') stages has been increased to 10, providing additional flexibility in how different processors are ordered in relation to one another.

4.11 CLIP INSERTS

The new Clip Inserter processor allows secondary clips to be run offset from the start, or end, of a primary clip. This allows, for instance, promos to be run over program credits. Both audio and video can be handled:

- Input audio (e.g. the original program) is faded down to a configurable level, and clip audio (e.g. the promo) is faded up to unity gain.
- Video is processed according to configurable effect parameters. Currently there are four effect types available:
 - Pushback – squash the input video to the left of the frame, and show clip video in whatever portion on the right is made available.
 - Picture-in-Picture (input reduced) – the input video is reduced down to a configurable rectangle and clip video plays full-frame behind it.
 - Picture-in-Picture (promo reduced) – the input video remains full frame and the clip video plays in a configurable rectangle
 - Hybrid – both input video and clip video play in configurable rectangles (having transitioned from full-frame) over a configurable background (e.g. still image or looping video)

The process can be scheduled as part of the standard transmission list preparation process.

4.12 CLIP EFFECTS ('SNIPES')

The new Clip Effect processor is similar in principle to the Clip Inserter, but allows an animation (e.g. a QT-RLE file) to be overlaid on top of the input video, including support for audio.

4.13 SLIDESHOWS

The new 'Slideshow' device supports a 'carousel' of still images – for instance to allow adverts to be shown in turn for a defined period within the transmission schedule.

4.14 FADE TO BLACK TRANSITIONS

The new 'dip-to-black' processor allows video and audio to be faded down to black/silence and then back up again, enabling simple transitions to be inserted between two clips which otherwise would not normally run back-to-back.

4.15 MULTI-DEVICE ROUTER PLUGIN

It has always been possible to monitor and control internal routing within the v-pipe process using router plugins, but the new multi-device plugin allows all of the relevant routers to be accessed easily from a single control.

4.16 PIPELINE DISPLAY PLUGIN

The new 'Pipeline Display' provides a clear indication of current routing within v-pipe for the selected output. This provides straightforward monitoring to ensure that the entire route is set correctly, particularly in the event of an auto-failover – for instance, if an input signal is lost.

4.17 REMOTE SCREEN-FEED INPUT

A new type of input processor, combined with a screen send application running on a separate, networked PC, allows part or all of a screen to be used as a source for v-pipe. The link between the screen-send application and the v-pipe input is established via IP over the network, so no external conversion hardware is required. Any screen (in a configuration with multiple monitors), any application window or any portion of the screen can be selected to be used, and audio can be sent alongside the video.

4.18 VIDEO STANDARDS CONVERSION (VSC) INPUT

A new type of v-pipe input processor provides handling for standards conversion, rather than requiring that all inputs and outputs run at the same resolution and frame rate.

4.19 VIDEO FRAME RATE CONVERTER (FRC)

The FRC processor has been extensively reworked to provide additional capability and flexibility for a wider range of conversion requirements.

4.20 AUDIO REMAPPING

It is now possible to remap audio tracks, e.g. to place audio received on the third input track onto the second output track.

4.21 MULTI-VIEWER PROCESSORS

Two new variations of multi-viewer processing have been added – one which generates an internal view of multiple sources (e.g. to use within an FMC session) using the defined pipeline format, and another which provides a separate video output (e.g. to feed an external monitor). The latter does not need to operate at the same resolution as the pipeline, so it can produce a 1080p/25 output from an SD-PAL pipeline, for example.

4.22 CUSTOM TRANSITIONS

The internal vision mixer now supports user-defined transitions in addition to the built-in effects. There are two options: the new 'matte' transition type uses a luma-matte video file to define the blending between the inputs and the new 'alpha' transition type uses an image+alpha video file overlaid on top of the blend results from the inputs. The alpha transition also includes the ability to use audio present in the alpha-clip file.

4.23 CEA-708 CLOSED CAPTIONS

Support for CEA-708 raw “cc_data_pkt()” sequences has been added to the v-pipe process.

4.24 MONITOR STREAM

Support for a new type of monitoring stream has been added. Rather than attempting to provide a view of the full signal, it updates once a second to show the video frame and audio level at that point. This provides an effective way to monitor multiple signals from a remote location.

4.25 AUTOMATIC SWITCHING

A new processor has been added to analyse channel content and write attributes into the internal signal path to provide signal monitoring data (for instance, freeze, black, silence, loss of signal). The preview and monitoring plugins have been extended to provide visible alerts based on the attribute data.

5 FLEXIBLE MEDIA CONTROLLER (FMC) USER INTERFACE

The FMC provides GUI capability for the aVS, aMS and QuBE systems, either locally on the server itself or remotely from any networked PC.

5.1 GUI RE-DESIGN & CONFIGURATION

The GUI has undergone a complete overhaul, with a completely new appearance, new ‘themes’ (allowing the style to be changed on-the-fly – for instance to switch immediately between a dark theme for use in a dimly-lit control room and a light theme for use in a bright office), extensive new configuration settings (allowing users to make their own design decisions) and improvements to operational behaviour – making the software easier to use in all environments.

5.2 DESIGN MODE

It has always been possible to customise the FMC ‘skins’ – the layout of plugins – using the Configure Plugins option. But the new Design Mode allows plugins to be moved, resized, added and removed directly, using the mouse and without having to switch views.

5.3 SKIN PAGES

It is now possible to add multiple ‘pages’ to a single skin, providing capability similar to the use of additional monitors. Pages associated with a skin remain active even when not visible – i.e. their plugins remain connected – and it is possible to switch quickly between pages using a simple key combination. This allows, for instance, plugins which only need to be used infrequently (e.g. relating to configuration) to be kept separately from those used more often (e.g. for operational control), providing more space for a clean and clear screen layout.

5.4 SIAM ALERTS

Messages generated by the native System Information, Alerting and Monitoring (SIAM) handling are now shown as ‘slide notifications’ in the bottom-right hand corner of the FMC screen, rather than as message boxes in the centre of the screen. This allows user operation to continue as normal, without being interrupted when alerts appear.

5.5 PORT SEQUENCE / PLAYLIST OPERATION

The handling for playout ports in Sequence or Playlist mode has been considerably extended, including the ability to drag items within the list (rather than simple move-up / move-down commands one at a time) and to drop items directly into the desired position (rather than being positioned at the bottom of the list by default).

5.6 COUNTDOWN DISPLAY

A new option to display 'countdown to next marker' has been added to the standard player plugin. This provides an effective way to work with specific events within the recorded clip.

5.7 ROUTER PLUGINS

The display plugin providing router control has been extended to allow buttons to be arranged across multiple rows (e.g. for large routers), specific sources or destinations to be hidden from the user if not required, and to provide a new 'lockout' to prevent unintended / unauthorised changes to routing.

5.8 PREVIEW WITH ROUTER PLUGIN

A new version of the Preview plugin provides a built-in router to provide direct access to any source within the selected group. This allows immediate switching between preferred content.

5.9 IP GADGET

A new 'gadget' allows IP addresses to be displayed for convenient access in the right-hand side gadget bar.

6 NEWTEK NDI™ SUPPORT

Comprehensive support for NewTek NDI™ interoperability has been added. In particular:

- v-pipe now has an NDI output processor, allowing delivery of NDI streams to other processes/systems
- v-pipe now also has an NDI input processor, allowing receipt of NDI streams from other processes/systems
- there is a new NDI virtual output media device, which appears as a selectable device in aVS ports allowing the standard output to be sent to other processes/systems.

The output format is defined by the configuration of the output processor or device object. The NDI input processor in v-pipe will accept any NDI stream regardless of format, frame size, frame rate, audio configuration, etc. All inputs are dynamically converted to the correct format for v-pipe as required. Further, the receiver can reconfigure itself on the fly, so the NDI stream can change format at will.

The NDI components also support full tally integration across the NDI links. In particular, this means that:

- if NDI inputs in v-pipe become 'on air' through a v-pipe video mixer, this is reflected to the NDI source that the input is connected to
- NDI outputs in v-pipe that receive a tally signal from the external receivers they are connected to will show as tally-active in e.g. the multi-viewer and preview streams for the NDI-output copy channel
the NDI output "device" reflects tally state back into the aVS, which means that if an output is using NDI to play into a Tricaster, for example, the Tricaster tally is automatically seen in the aVS and hence the play-on-tally functions can operate without requiring any other tally interfacing.

7 LOW POWER SERVER FIRMWARE (LPS)

A new version of the main firmware supports use on smaller / less powerful hardware platforms. This firmware, which runs without a local GUI (all control and configuration can be carried out remotely from any networked PC), provides an effective solution for single channel aVS servers (e.g. providing one record port, playout port, encode channel or standards conversion) and also native prompt servers.

8 ARCHIVE / RESTORE FIRMWARE (ADAM)

The ADAM firmware, which provides integrated media backup functionality, has been extended to provide improved capability for use of remote / 'cloud-based' archive servers.

9 NETWORK NODE FIRMWARE

A brand-new version of firmware has been produced, tailored for operation as one management node on a wider network. This firmware supports a range of standard network functionality for the local network (LAN) – for instance DNS, DHCP, firewall, traffic management, connection failover, load balancing, etc. – but also enables elaborate functionality between nodes on the wider network (WAN) to be established. This allows for 'enterprise' connectivity between different sites, supporting functionality such as:

- access between sites via virtual private tunnels allowing, for instance, a user inside any site to access servers at any other site
- remote access to internal servers for authorised users on the general internet outside of the network
- prioritised routing for important traffic, e.g. for uploads to customer servers or transfers of transmission content
- efficient movement of media between servers at different sites, based either of manual intervention or automatic transfers (e.g. to ensure that a clip from a local server is uploaded to a central transmission system in time for playout)
- the ability to archive to, and restore from, a central archive system
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