Quality Assurance and Control Measures:
Considerations for AudioVisual Reformatting

This document is intended to provide an overview of the quality assurance/control factors and measures that should be considered when performing audiovisual reformatting. This is meant to offer a landscape perspective as an aid in the creation of a statement of work, internal lab QA/QC procedural development, or to better enable communication and understanding between the client and vendor. This is not intended to be a quality control checklist as much as it is a palette with which to work in designing a QA and QC program for various workflows.

QA/QC measures	Description
Preventative	
Knowledge of preservation principles	The staff must generally recognize and understand preservation principles.
Care and handling knowldege	Anyone handling the media must have experience handling legacy and current AV media, and be able to perform basic processing without damaging media; ability to flag basic, significant issues as critical.
Storage environment	Temperature, humidity and air quality should be within acceptable ranges with minor variation. Shelving should be adequate size to store media properly and the room should be clear of any obvious signs of disaster (ie. underneath a bathroom or in the basement)
Monitoring environment	Must not detract from evaluating integrity.
Security	Media should be stored in an adequately secure environment
Routine Maintenance	Equipment must be well maintained. Facility must have capability to perform critical maintenance and routine maintenance of components and system
Service Manuals	Is a good indicator of proper maintenance, upkeep and operation of the equipment
System Integrity	Routine testing of the sytem should be performed in order to ensure its integrity. This would comprise passing standard reference test signals using a high-end generator through the system and analyzing the signals on output to ensure integrity.
System Design	Wiring and routing should maintain integrity -- avoiding daisy chaining signals of any sort; keep A/D conversions to a minimum; maintain high quality throughout all components; maintain proper gain staging
Range of Equipment	The facility must have a wide enough range of equipment to be able to transport and reproduce the variety of formats that it is working with (audio 1/4", open reel 1/2 track, 1/4 track, 4 track, etc…). In order to ensure compatability compliance the facility should have multiple brands and model numbers of a given format for those formats known to have compatability issues (i.e. DAT, 1/2" video)
Process Documentation	Documentation of technical and non-technical processes to ensure consistency and integrity
Supplies	Supplies must include test and reference media for proper calibration and alignment of all equipment used, proper tools for safely cleaning and servicing the machines (i.e. demagger,100% isopropyl,) and appropriate tools for repairing and treating media (splicing/repair workstations with quality splicing tape, tech Q-Tips, correct cleaning fluids)
Equipment transports	All equipment transports should be safe and stable, and should maintain integrity of the object (i.e. maintain even, straight wind with tape)

QA/QC measures	Description
Pre-Transfer and Transfer	
AV engineering experience	Anyone reproducing content and making quality judgements must have enough knowledge of AV to be able to know how to work with media and signals to maintain integrity, calibrate and align legacy and modern equipment, troubleshoot issues and errors
Alignment and Setup	All reproduction devices should be setup and aligned to media to obtain optimal signal output (ie. azimumth alignment and level setting for audio or tracking, luma gain and chroma gain and phase setup)
Content	In absence of bars and tones the source content should be setup (same examples as above)
data entry	metadata should be entered in as few times as possible to avoid errors
metadata	guesses should be avoided at all costs, data known to be incorrect or differing from the media labels should be corrected.
documentation	the process chain should be documented defining the signal path. All errors and AV artifacts exhibitied in the content should be documented.
Reference	Standard reference bars and tones will be recorded with each recording to serve as documentation of the sytem integrity
Processing	No processors shall be used that will sacrifice the integrity of the original signal. (this does not include the use of tools such as Timebase correctors, distribution ampliiers, etc.. It is intended to address what would be considered sonic/visual restoration or enhancement)
checksum	Two checksums shall be created for each file as soon after its creation as possible. One will be for the entirety of the file and the other will be for the essence or payload only.
Metadata entry	Data entry for issues missed by the automated analysis and reporting.
Monitoring	That high end monitoring and analysis tools be used for monitoring during transfer. That monitoring and analysis take place at multiple points in the signal path. Most notably pre and post any processing or conversion.
Analysis	That high end analysis tools be used for monitoring at setup and during the transfer (such as Waveform monitors, vectorscopes, oscilloscopes) to monitor analog and digital signal characteristics. Tools for monitoring event based (clicks, dropouts) errors and global characteristics (bandwidth, levels)
Diagnostics	That the equipment and tools used are appropriate for dealing with sensitive unique materials. That the operator has the expertise to accurately diagnose any issues and recommend an appropriate treatment.
Treatment	That the equipment and tools used are appropriate for treating with sensitive unique materials. That the operator has the expertise to perform the treatment safely and with skill.

QA/QC measures	Description
Post Transer	
Functionality	That all files open and playback.
Completeness	The amount of program on all of surrogates and derivatives match each other and the original recording.
Integrity	That all surrogates and derivatives maintained the integrity of the original. That any artifacts that exist in the surrogate or derivates also exist in the original. That all audio and video levels are consistent for each copy.
Metadata	That all required metadata exists in the correct location and be consistently displayed across all surrogates and derivatives
Comparative analysis	Of content or reports to ensure that significant differences are flagged between the original, surrogates and derivatives.
AV knowledge	Anyone making quality judgements on content comparisons needs to have sufficient knowledge to interpret issues raised.
Environment and Equipment	Equipment and the environment used for performing quality judgements must be capable of accurately reproducing content with integrity without alteration of the signal or impaired perception of the content.
Timecode	Any preserved timecode stream persisted with integrity when compared to the original. Referenced timestamps in original documentation should be preserved and all surrogates and derivatives should match.
Sync	For video only, that sound sync is preserved and matches in all surrogates and derivatives.
Checksum Validator	verify validity of checksum.
File Validator	A file validation tool such as Jhove shall be used to ensure that the produced file is well formed and a valid instance of the file format specification.
Metadata Validator	A metadata instance document validation tool such shall be used to ensure that the produced metadata document is well formed and a valid instance of the metadata schema
Automated Metadata Validation	Manual validation of reported issues generated by the automated analysis and documentation.
Media	If media based, ensure that media is free of significant error rates and that the content can successfully be reproduced from the media. That any labeling is accurate.
Client Specs	
Naming Conventions	Ensure that all identifiers and titles are accurate and consistent throughout all surrogates and derviatives
Organization	Ensure that any organizational conventions are followed and that all files exist placed on the specified media.
Metadata	Any client specified embedded/non-embedded metadata exists and is accurate
Resolution	Is as specified
Bit rate	For surrogate and derivatives is as specified
Frame rate	For surrogate and derivatives is as specified
Channels of audio	Are accurate and all channels on all surrogates and derivates match the original
Color Space	For Video only - is as specified
Aspect Ratio	For Video only - is as specified
Ongoing	
Redundancy	On physically different media to avoid loss
Geographic separation	In case of disaster
RAID	As a means of data protection
Data integrity checks	Routine checking of disk health (ie. SMART) , bad blocks, and verification of checksums.