grass valley

AMP
ADVANCED MEDIA PROTOCOL
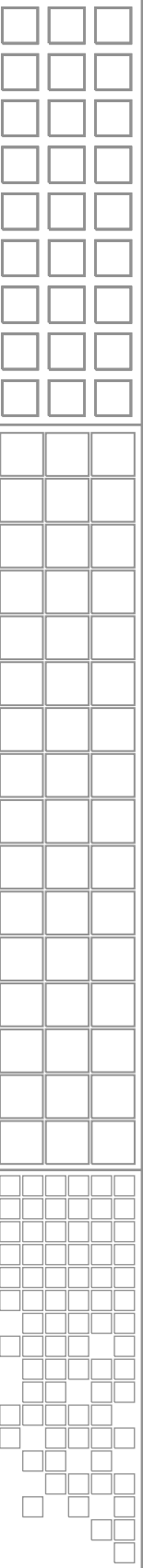
AMP AT A GLANCE

VERSION 1.1

JAN 2006
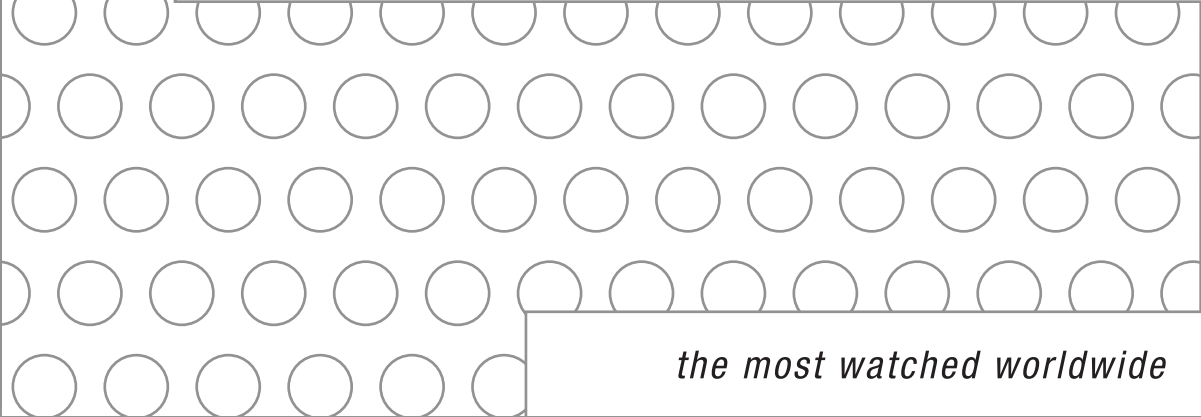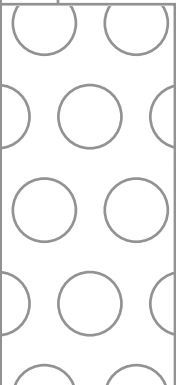
the most watched worldwide

Revision Status

Version Number	Revision Date	Description
1.0	3/25/2004	Initial release
1.1	01/04/2006	Formatted, re-organized for clarity, updated to include transfer and play list info.

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1   Introduction

Designed to meet the demands of the video broadcast industry, Advanced Media Protocol (AMP) is based on an amalgamation of digital video technology expertise and experience in control and automation of video systems.

AMP at a Glance provides a high level overview of the Advanced Media Protocol, explaining new features and advantages offered by this protocol. This document is intended to help developers understand AMP and apply it to video disk recorder control.

2   References

AMP Specification

3   Key Features

This section describes control scenarios for several important functions that will be performed using a video disk recorder. These scenarios will describe the command sequence and expected responses and status changes.

For better readability and understanding, commands are expressed by listing the command code, command parameters and user data in hexadecimal format along with explanations. Note that these listings correspond to the actual hexadecimal byte stream that would be sent by a controlling device. Refer to *AMP Specification* for a complete listing and detailed descriptions of commands and responses.

A controlling device will likely be issuing status sense and current time sense (both time and user bits) commands continually throughout these scenarios. These status sense commands are not necessarily listed in the scenarios, but keep in mind they may be issued at any time.

3.1   Multiple platform support

The AMP protocol is currently supported and available over multiple media platforms and is used in many product solutions. AMP is currently available on K2, Turbo, Profile XP series, M-Series iVDR, News Browse and DNP. Automation control developers and third party developers can thus use AMP to seamlessly integrate multiple systems into their product architectures.

3.2   Multiple communication methods

The RS-422 port is the most common method to control video storage equipment. Most video disk recorders are being implemented using standard computer systems. This facilitates new methods of communication. In particular, a video disk recorder may be connected via a network to other computer systems, including the controlling device. In a networked environment, commands could be issued through the network using protocols such as TCP/IP, IPX, RPC, etc.

AMP can be used to communicate using RS422 and TCIP Ethernet.

3.3 Extended File Names

Traditionally, control protocol support for clip and file names has been limited to 8 bytes. This has not enabled users to create realistic and practical names. AMP supports variable length clip names, allowing lengths up to 64K bytes. The size of the clip name is thus limited only by the capabilities of the video disk recorder. For example, the Profile series supports clip names up to 32 chars, which limits the allowable clip name length that can be sent using AMP to 32 chars. Other video disk recorders may support other clip name lengths.

3.4 Play clips

Video material is output based on a time code position within the currently loaded ID. In most situations, a user will specify a starting time code position prior to playback. This "starting time code" will be the time code where clip playback begins. If a play cue is issued without specifying a time code position, the time code position will default to the first field of video. The video disk recorder will set the current time code position as specified, and output the video material corresponding to the current time code position.

The video disk recorder will always output the video material corresponding to the currently loaded ID and time code position, regardless of whether the time code position is changing (playing, rewinding, etc.) or not (cued, stopped, etc.). If video material has been recorded to the current time code position, the recorded video material will be output. If no video material was recorded to the current time code position, black will be output.

When playback begins, the time code position will advance and new video material will be output until playback is stopped. When playback is stopped, video material corresponding to the time code position where playback was stopped will be output.

Clips can be cued and played several ways, as follows.

3.4.1 Cue and Play
Cue a clip through **Cue Up With Data** command and issue a **Play** command.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Cue up with data	28 31 31 20 20 20 20 20 20	Loads the clip to SOM
Play	20 01	Start playing the clip
Stop	20 00	Stops the play out

3.4.2 Play from a specific timecode

Cue a clip to a specific time code using the **Cue Up With Data** command and issue a **Play** command.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set the timer mode to VITC
Cue up with data	2C 31 00 00 15 10 31 20 20 20 20 20 20 20	Loads the clip to 10:15:00:00 timecode.
Play	20 01	Start playing the clip
Stop	20 00	Stops the play out

3.4.3 Play from a specific timecode (Scheduled Play)

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Cue up with data	28 31 31 20 20 20 20 20 20	Loads the clip to SOM
Play	24 01 00 10 12 12	Start playing the clip at 12:12:10:00.
Stop	20 00	Stops the play out

3.4.4 In Preset and Play

Cue a clip using the **In Preset** command and issue a **Play** command.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
In Preset	48 14 31 20 20 20 20 20 20 20	Loads the clip to SOM
Play	20 01	Start playing the clip
Stop	20 00	Stops the play out

3.4.5 In Preset to a specific timecode and Play

Cue a clip to a specific timecode using the **In Preset** command and issue a **Play** command.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set the timer mode to VITC
In Preset	4C 14 00 00 15 10 31 20 20 20 20 20 20 20	Loads the clip to 10:15:00:00 timecode.
Play	20 01	Start playing the clip
Stop	20 00	Stops the play out

3.4.6 Creating AMP Play Lists

This section explains how to create a basic play list using AMP protocol. Issue the commands in sequence, following the information in the "comments" column for each clip you want to add to the play list.

Mnemonic	AMP command	Comments
Auto mode on	40 41	This command enables auto play of video segments as defined by the auto mode ID and In and Out Preset values.
In Preset	4A 14 00 07 00 05 43 6C 69 70 31	Cue 'Clip1' starting at start of material. Check the 'In Preset' status byte to verify the commands completion.
Out Preset	44 15 ff ss mm hh	*'ff ss mm hh' represents the clips out point.* Check the 'Out Preset' status byte to verify the commands completion.
Play	20 01 or 24 01 ff ss mm hh	Send the **Play** command to start playing the first clip. You may specify a time code to execute play. *'ff ss mm hh' represents the time to execute play out.*
Preview In Preset	AA 04 00 07 00 05 43 6C 69 70 32	Cue 'Clip2' starting at start of material. Check the 'Preview In Preset' status byte to ensure the operation is complete.
Preview Out Preset	A4 05 ff ss mm hh	*'ff ss mm hh' represents the clips out point.* Check the 'Preview Out Preset' status byte to ensure the operation is complete.

After the first clip has finished playing, the second clip will automatically move to the play head. Both the preview status bytes will be set low, signifying the transition and notifying the automation that it is now time to put the next clip into the preview head.

When the play list is complete, simply stop the playback (*0x2000*) when you wish, eject (*0x200F*) the clip, and you are finished. Repeat steps for each additional clip you want to add to the play list.

3.5 Clip List

AMP allows the user to cue either a single clip or a list of clips on the video server. AMP also supports 2 timelines, which means users can cue clips onto two separate playlists that will play out clips continuously.

3.5.1 Load multiple clips and play

The following example illustrates how to load multiple clips using the extended **In Preset** command.

Clip ID	Start of the Material	End of the Material
6	12:05:19:15	12:06:31:29
7	12:11:04:08	12:12:08:28
8	12:12:53:18	12:14:05:07

Mnemonic	AMP command	Comments
Auto Mode on	40 41	
In Preset	4A 14 00 09 00 01 36 00 01 37 00 01 38	Load Clip 6, 7, and 8 to their SOM.
Play	20 01	Starts playing clip 6 and continue playing till the end of clip 8.

3.5.2 Load multiple clips to specific timecode and play

Load multiple clips to specified timecode using the extended **In Preset** command. The following example illustrates how to load multiple clips to a specified timecode using the **In Preset** command.

Clip ID	Start of the Material	End of the Material
6	12:05:19:15	12:06:31:29
7	12:11:04:08	12:12:08:28
8	12:12:53:18	12:14:05:07

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	
In Preset	4E 14 00 18 0e 00 01 15 20 05 12 36 0e 00 01 08 05 11 12 37 0e 00 01 18 54 12 12 38	Load Clip 6 to 12:05:20:15, Clip 7 to 12:11:05:08 and Clip 8 to 12:12:54:18
Play	20 01	Clip 6 plays from 12:05:20:15 Timecode position to its EOM.

		Similarly, Clip 7 & 8 play from 12:11:05:08 & 12:12:54:18 to their EOM respectively.

3.6 Record clips

Video material is recorded based on a time code position within the currently loaded ID. In most situations, a user will specify a starting time code. This "starting time code" will be the time code for the first frame in the clip. If a **Record Cue Up With Data** command is issued without specifying a time code position, the time code position will default to "00:00:00:00."

Before recording begins, it is often useful to know if there is sufficient storage in the video disk recorder for the new material. Because of the nature of video compression, the video disk recorder may not be able to determine the exact amount of storage a segment of video material will require until after it is recorded and compressed, but the video disk recorder should be able to compute the worst case storage requirement for a given duration of video material. The longest contiguous available block of storage in the video disk recorder can be queried by requesting it (A0.1C **Longest Contiguous Storage Request**).

A recording will start with a **Record Cue Up With Data** command followed by the **Out Preset** command. This determines the duration of the recording. If there is insufficient space to hold the worst-case compression requirements for the given duration, the recording will stop. An "End of Tape" condition will result, and the "Tape End" status bit will be set to high. Video material can also be recorded without specifying duration prior to recording.

When recording begins, the time code position will advance and new video material and user bits will be recorded until the recording is stopped. Video material and user bits recorded to a previously unused time code position will be stored by the video disk recorder, thereby "replacing" the default black. Video material and user bits recorded to an already used time code position will replace any previously recorded material in that time code position. If the video disk recorder runs out of available storage during the recording, the recording will stop and an "end of tape" condition results.

3.6.1 Create a zero length clip and record

Clip ID	Start of the Material	End of the Material
2		

Mnemonic	AMP command	Comments
Auto Mode on	40 41	
Record Cue up with Data	A8 02 32 20 20 20 20 20 20 20	Create a Zero length Clip, Clip ID 2
Record	24 02 00 10 12 12	Starts recording
Stop	20 00	Stops the recording

3.6.2 Record from a specific timecode (Scheduled Record)

Clip ID	Start of the Material	End of the Material
2		

Mnemonic	AMP command	Comments
Auto Mode on	40 41	
Timecode mode	41 36 02	Set the timer mode to VITC
Record Cue up with Data	AC 02 00 10 12 12 32 20 20 20 20 20 20 20	Create a Zero length Clip 2 with start position 12:12:10:00
Record	20 02	Starts recording from 12:12:10:00
Stop	20 00	Stops recording

3.7   Setting In/Out Points

The **In Preset, Out Preset, Preview In Preset** and **Preview Out Preset** command extensions allow the user to set the In and Out points of a clip so that the clip can be played from specified timecodes.

3.7.1   Set In and Out points for a single clip

Load a clip to a specified timecode using the extended capabilities of the **In Preset** command. Issue an **Out Preset** command to set the out point of a cued clip to a specified timecode.

Clip ID	Start of the Material	End of the Material
6	12:05:19:15	12:06:31:29

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	
In Preset	4E 14 00 08 0e 00 01 15 20 05 12 36	Load clip 6 to 12:05:20:15. i.e. In point of the cued clip
Out Preset	4E 15 00 08 0e 00 01 00 30 05 12 36	Set the out point to 12:05:30:00 timecode
Play	20 01	Plays between 12:05:20:15 to 12:05:30:00

3.7.2 Set In and Out points for multiple clips

Load multiple clips to a specified timecode using the extended capabilities of the **In Preset** command that sets the In points for each clip in a clip list. Issue an **Out Preset** command to set the Out point for each clip in a clip list to a specific timecode.

Clip ID	Start of the Material	End of the Material
6	12:05:19:15	12:06:31:29
7	12:11:04:08	12:12:08:28
8	12:12:53:18	12:14:05:07

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	
In Preset	4E 14 00 18 0e 00 01 15 20 05 12 36 0e 00 01 08 05 11 12 37 0e 00 01 18 54 12 12 38	Load clip 6 to 12:05:20:15, clip 7 to 12:11:05:08 clip 8 to 12:12:54:18
Out Preset	4E 15 00 18 0e 00 01 15 30 05 12 36 0e 00 01 08 15 11 12 37 0e 00 01 18 59 12 12 38	Set out point for clip 6 to 12:05:30:15,for clip 7 to 12:11:15:08, for clip 8 to 12:12:59:18

3.7.3 Retrieve In and Out points of clips

After using the commands **In Preset**, **Preview in Preset**, **Out Preset**, and **Preview Out Preset** to place clips in the timeline, you may issue the commands again with the byte count equal to "2." This option will return all the clips currently loaded into that position on the timeline, as well as the values that correspond to the specific command issued.

3.8 Network Transfer

Video disk recorders utilize compressed digital video storage. It is therefore possible to transfer video material in a compressed digital format at much higher speeds than would be possible in a real-time analog format.

Using AMP a video disk recorder can transfer compressed digital video between its primary and secondary storage, or to other video disk recorders using the same or different video storage formats. For example, you can seamlessly transfer files between a M-Series iVDR and Profile XP and vice versa.

3.8.1 AMP Extended ID Transfers

This section describes the basic workflow for AMP Extended ID transfers, how to initiate a transfer and how to ensure that the transfer is conducted as expected. To execute a transfer, issue the following commands in sequence. Follow the instructions in the "comments" column.

Mnemonic	AMP command	Comments
ID Status Request	AA 18 00 05 43 6C 69 70 31	(Optional) ID Status request for clip 'Clip1'.
Extended Transfer ID	C2 25 00 22 03 00 14 58 50 31 2F 56 3A 2F 64 65 66 61 75 6C 74 2F 43 6C 69 70 31 FF FF FF FF FF FF FF FF 03 00 14 58 50 32 2F 76 3A 2F 64 65 66 61 75 6C 74 2F 43 6C 69 70 31	Transfer 'Clip1', in it's entirety, from "XP1/V:/default/Clip1" to "XP2/V:/default/Clip1"
Transfer ID Status Request	C1 27 00 18 00 00 14 58 50 32 2F 56 3A 2F 64 65 66 61 75 6C 74 2F 43 6C 69 70 31	Request state of "XP2/V:/default/Clip1". Begin polling status' every few seconds. You may poll for the general status, as well as percent, bytes, and fields transferred. For each transfer, continue polling until the transfer is complete.

You may issue multiple transfers at once, up to the limit specified for the server model in use. The Grass Valley server will conduct at one time as many transfers as possible under the specified limit for that server model. Once this limit has been reached, waiting transfers will be reported as "queued or in the building state."

3.9   Copy (Shallow / Deep)

AMP allows the user to copy clips with the **New Copy** command. Two types of clip copy are supported. They are Deep Copy and Shallow Copy. A Deep Copy copies all of the clips material to a new position in storage. A Shallow Copy simply creates a new reference to the existing media in the desired location.
Issue a **New Copy** command without In and Out points. The size of the newly created clip will be the same as that of the source clip.

3.9.1 Deep Copy

Deep Copy recreates the media for the new clip from the source clip.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	

Deep copy	AA 19 00 08 44 00 01 31 00 02 39 39	Create clip '99' from clip '1'
In Preset	48 14 39 39 20 20 20 20 20 20	Load clip 99

3.9.2 Shallow Copy

Shallow Copy copies a clip as a reference to the source clip media.

Mnemonic	AMP command	Comments
Timecode mode	413602	Set timer mode to VITC
Auto mode on	4041	
Shallow copy	AA 19 00 08 53 00 01 31 00 02 39 39	Create clip '99' from clip '1'
In Preset	48 14 39 39 20 20 20 20 20 20	Load clip 99

3.10 Sub-clips

The **New Copy** command supports the creation of sub clips from a source clip. To create a sub-clip, simply issue the **New Copy** command with In and Out points.

3.10.1 Sub-clip using Deep Copy

Creating a sub-clip using Deep Copy will regenerate the sub-clip media in a new storage position separate from the source media.

Clip ID	Start of the Material	End of the Material
1	10:12:30:10	10:25:30:24

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	
Deep copy	AE 19 00 10 44 00 01 31 00 00 14 10 20 30 25 10 00 02 39 39	Create media/sub-clip 99 from 10:14:00:00 to 10:25:30:20 from media '1'
In Preset	48 14 39 39 20 20 20 20 20 20	Load clip 99 to SOM i.e. 10:14:00:00

3.10.2 Sub-clip using Shallow Copy

Creating a sub-clip using Shallow Copy will generate the sub-clip as a reference to the source clip media.

Mnemonic	AMP command	Comments
Timecode mode	41 36 02	Set timer mode to VITC
Auto mode on	40 41	
Shallow copy	AE 19 00 10 53 00 01 31 10 30 12 10 20 30 25 10 00 02 39 39	Create sub clip 99 from 10:12:30:10 to 10:25:30:20 from media '1'
In Preset	48 14 39 39 20 20 20 20 20 20	Load clip 99 to SOM i.e.10: 12:30:10

3.11 Metadata /clip data management

Clips may have metadata or user data associated with them. AMP's **Clip Data** and **Clip Data Request** commands provide the ability to read and write clip metadata to or from the video server database.

3.12 Folder management

Clips may be grouped and stored together in different folders according to user requirements. AMP allows the user to create, delete, and rename folders. Additionally, users can request and change the current working folder or retrieve the names of all folders from the video disk recorder.

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