Videotape Identification and Assessment Guide

Texas Commission on the Arts
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Introduction

Museum staff are increasingly faced with the identification, care, and conservation of videotape formats found in their collections and archives, some of which are many decades old. Staff must inspect the works to assess condition – often without the use of playback equipment – and catch problems before they compromise the works. Videotape has particular storage, housing, and handling needs that when addressed, will substantially prolong its shelf life. At some point in its lifecycle, more drastic measures, such as cleaning and re-formatting, will be necessary to allow future generations to experience art works created through the use of electronic tools.

This guide was created to answer questions commonly asked by custodians of video materials:

HOW CAN I IDENTIFY A VIDEO FORMAT AND KNOW ITS CHARACTERISTICS?

IDENTIFICATION OF VIDEO FORMATS ➤ provides pictures and identifying features of 15 videotape formats. ➤ *page 3*

WHAT ARE THE RISKS TO VIDEO MATERIALS?

RISKS TO VIDEOTAPE LONGEVITY ➤ gives an overview of common damage caused by people, machines, the environment, and equipment obsolescence. ➤ *page 37*

HOW CAN I EVALUATE THE CONDITION OF A VIDEOTAPE?

CONDITION ASSESSMENT ➤ explains how to inspect videotapes and determine condition through observation and inference. ➤ *page 41*

WHAT CONSERVATION ACTIONS SHOULD BE TAKEN IF THE VIDEO IS AT RISK?

CONSERVATION ACTIONS ➤ provides guidance for typical first steps through in-house actions and/or the use of vendor services. ➤ *page 44*

WHERE CAN I LEARN MORE ABOUT VIDEO PRESERVATION?

RESOURCES FOR VIDEO PRESERVATION ➤ leads you to sources for more in-depth information, conservation supplies, and key vendors. ➤ *page 49*

GLOSSARY

Gives definitions of terminology used within the guide and accompanying web site. ➤ *page 52*

SOURCES AND CREDITS

Is our thanks to the many people that made this guide and accompanying web site possible. ➤ *page 54*

Identification

Tape Formats

The formats below represent formats or families of formats that are likely to be found in museum collections. See Resources for links to more guides including more obscure formats.

OPEN REEL

2" Quad ➤ page 4

1" Type C ➤ page 6

1/2" Open Reel ➤ page 8

CASSETTE

3/4" Umatic and 3/4" Umatic SP ➤ page 10

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VHS & S-VHS ➤ page 15

Betacam & BetacamSP ➤ page 17

Video8 & Hi8 ➤ page 20

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D3 ➤ page 25

Digital Betacam ➤ page 27

DVCAM ➤ page 29

MiniDV ➤ page 31

DVCPro ➤ page 33

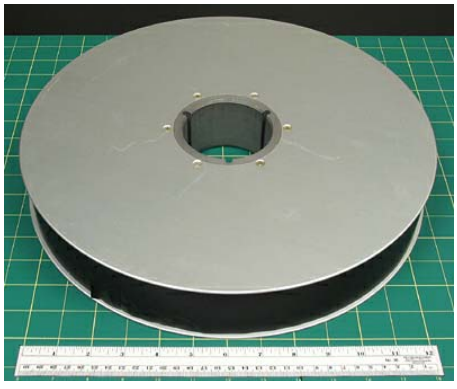
Digital 8 ➤ page 35

Identification

➤ 2″ Quad

TOP ➤

BOTTOM ➤



CASE ➤

FORMAT NAME ➤ 2" Quad (aka 2″ Quadruplex)

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ 1956

DATES IN USE ➤ 1956 – early 1980s

TAPE WIDTH ➤ 2″

REEL DIMENSIONS ➤ Approximately 12″ in diameter.

TAPE CONTAINER ➤ Shipping cases for 2" Quad are a 4" deep, 15" square and can weigh 20-30 lbs. You may also find these tapes in cardboard boxes.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Once you have seen a quad case, it will be easy to identify. It is substantially larger and heavier than any of the other video formats. The containers will typically have large labels with program titles, show air dates, record dates, and/or other information consistent with a broadcast television environment.

COMMON MANUFACTURERS/BRANDS ➤ 3M, Ampex. Some tapes or containers will indicate the manufacturer as the Minnesota Mining and Manufacturing Company, later shortened to 3M.

TAPE PLAYERS/RECORDERS ➤ Machines for this format are very rare, especially in working order. They are found with preservation/restoration vendors and occasionally in television stations. It is almost impossible to find parts, and some parts need to be manufactured. It is also extremely difficult to find people to repair these machines. Not all 2″ quad tapes will play on the same 2″ quad machine.

Identification

➤2" Quad

PRIMARY USAGE ➤ 2" was the first video format, developed for in-studio use. Artists who have taped in this format generally produced in a studio setting, such as through a public television residency program or other television project.

RISKS ➤ Due to its sheer age, 2" quad is at great risk of signal loss due to problems with the physical material, and from hardware and media obsolescence. See Risks.

CONDITION ASSESSMENT ➤ Some 2" quad shipping containers have a spongy lining that deteriorates over time into a powdery and then gummy substance that is very difficult to clean off of the tape. Extensive inspection is difficult without playback, though assessment can be made for signs of binder deterioration, mold, and other problems. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Immediate re-mastering is recommended through a vendor with proven experience with this format. Cleaning may be required before transfer. Re-housing of the original may be required. See Conservation Actions.

RESOURCES➤ The following web sites have additional information on 2" quadruplex.
LabGuy's World – http://www.labguysworld.com/
Tim Stoffel's Quadruplex Park – http://www.lionlamb.us/quadpark.html
Vidipax – http://www.vidipax.com

See also Resources.

Identification

➤ 1" Type C

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ 1" Type C (aka 1")

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ 1978

DATES IN USE ➤ 1978 – 1990s

TAPE WIDTH ➤ 1"

REEL DIMENSIONS ➤ Approximately 12" in diameter and have a distinctive wide hub.

TAPE CONTAINER ➤ Common containers are made from plastic and are rectangular, or have one curved side with a handle. 1" can also be found in cardboard containers. The containers will typically have large labels with program titles, show air dates, record dates, and/or other information consistent with a broadcast television environment.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ There are numerous forms of 1" tape that did not succeed in the marketplace, and some are indistinguishable except on playback. Audio recordings are also made on 1" tape and may be confused with video recordings.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Ampex, Panasonic and others.

TAPE PLAYERS/RECORDERS ➤ Machines for this format are rare, especially in working order. They are found primarily with preservation/restoration vendors, though some television stations and collectors still have working 1" machines. It is difficult to find parts, and some parts need to be manufactured. It is also difficult to find people to repair these machines.

Identification

➤ 1" Type C

PRIMARY USAGE ➤ 1" was typically used for in-studio recording. Artists who have tape in this format produced in a television station or other studio setting. It was also used as a format for preservation masters in the late 1980s and early 1990s..

RISKS ➤ Due to its sheer age, 1" is at great risk of signal loss due to problems with the physical material, and from hardware and media obsolescence. See Risks.

CONDITION ASSESSMENT ➤ Extensive inspection is difficult without playback, though assessment can be made for signs of binder deterioration, mold, and other problems. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Re-mastering is recommended through a vendor with proven experience with this format. Cleaning may be required before transfer. Re-housing of the original may be required. See Conservation Actions.

RESOURCES➤ The following web sites have additional information on 1" quadruplex.
LabGuy's World – http://www.labguysworld.com/
Vidipax – http://www.vidipax.com

See also Resources.

Identification

➤ ½" Open Reel

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ 1/2" Open Reel

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ 1965

DATES IN USE ➤ 1965 – late 1970s

TAPE WIDTH ➤ 1/2"

REEL DIMENSIONS ➤ Commonly used reels are 5" in diameter or 7 1/4" in diameter.

TAPE CONTAINER ➤ The most common containers for smaller tapes are approximately 5 1/2" x 5 1/2" x 1" and made of a soft or hard plastic. Larger reels will be in containers approximately 8 3/8" x 8 3/8" x 1 1/4". The plastic container may also be inside of a separate paperboard sleeve. There are other containers that are approximately the same size but have handles.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ There are two common 1/2" tape versions – CV and AV (EIAJ Type 1) – they look the same, but will playback on different decks. CV tapes were manufactured beginning in 1965; AV was introduced in 1969. The tape reels are typically made from translucent plastic. The Sony tape containers are typically black and will say "for helical scan video recorders."

COMMON MANUFACTURERS/BRANDS ➤ Sony, Panasonic, Ampex, and others.

TAPE PLAYERS/RECORDERS ➤ As noted above, not all 1/2" tapes will play on the same deck. The AV or EIAJ format became the recording standard. Decks for this format are rare, especially in working order. They are found primarily with preservation/restoration

➤ ½" Open Reel

vendors, media arts centers, schools, and with artists and collectors. It is difficult to find parts, and some parts need to be manufactured. It is also difficult to find people to repair these decks.

PRIMARY USAGE ➤ The 1/2" open reel format was developed for the industrial, educational and consumer markets. Artists, independent producers, community organizers, schools, and television stations were among the groups using this format. The smaller reels were used in the first portable video recorders or "portapaks." The larger reels were typically used for stationary recording and/or video editing. 1/2" open reel was gradually replaced with cassette formats in the mid to late 1970s.

RISKS ➤ Due to its sheer age, 1/2" open reel is at great risk of signal loss due to problems with the physical material, and from hardware and media obsolescence. See Risks.

CONDITION ASSESSMENT ➤ Extensive inspection is difficult without playback, though assessment can be made for signs of binder deterioration, mold, and other problems. 1/2" open reel tapes are known for problems with sticky shed syndrome. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Re-mastering is recommended through a vendor with proven experience with this format. Cleaning is likely to be needed before transfer. Re-housing of the original may be required. See Conservation Actions.

RESOURCES➤ The following web sites have additional information on 1/2" open reel.

Experimental Television Project Video History Project – Tools –
http://www.experimentaltvcenter.org/history/tools/tools.html
Experimental Television Project Video History Project – Preservation –
http://www.experimentaltvcenter.org/history/preservation/preservation.php3
BAVC Video Preservation Resources – Hardware
http://www.bavc.org/preservation/dvd/resources/hardware.htm
Vidipax – http://www.vidipax.com
LabGuy's World – http://www.labguysworld.com/

See also Resources.

Identification

➤3/4″ Umatic and 3/4" Umatic SP

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ 3/4″ Umatic (aka 3/4″ or Umatic) and 3/4″ Umatic SP (aka 3/4″ SP or Umatic SP)

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ 3/4" Umatic – 1971
➤ 3/4" Umatic SP – 1986

DATES IN USE ➤ 3/4" Umatic –1971 to present ➤ 3/4" Umatic SP – 1986 to present

TAPE WIDTH ➤ 3/4"

CASSETTE DIMENSIONS ➤ Full-size cassettes are 8 5/8" x 5 3/8" x 1 3/16", and small cassettes are 7 1/4" x 4 5/8" x 1 3/16".

TAPE CONTAINER ➤ Most common tape containers are heavy-duty plastic snap-closure boxes – typically blue, gray, black or tan. Some 3M tape boxes are black with rounded corners and have a sliding closure mechanism on the opening side.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Full size cassettes are for use in recording and editing decks, and record up to 60 minutes. Small cassettes are used in field recording decks, and record up to 20 minutes in length. 3/4" Umatic cassettes are typically made from gray, black or tan plastic. Hubs can be any number of colors (blue, tan, red), and cassettes have a clear (or slightly blue) window that shows both reels. A small red plastic dot (which must be in place to record on the tape) may be found on the back of cassette. 3/4" Umatic SP cassettes are dark brown/maroon and have SP and the length written on the spine (3M brand).

COMMON MANUFACTURERS/BRANDS ➤ Sony, 3M (Scotch), Fuji and others.

Identification

➤3/4″ Umatic and 3/4" Umatic SP

IDENTIFYING MARKS ➤

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

TAPE PLAYERS/RECORDERS ➤ 3/4″ Umatic was a widely used format, and although production of these decks ceased in the 1990s, it is still in limited use. 3/4″ Umatic SP has a superior picture quality to regular 3/4″. The number of available working decks will continue to diminish, and parts are becoming increasingly difficult to obtain. They are found primarily with preservation/restoration vendors, small production houses, media arts centers, schools, and with artists and collectors. New tape stock is still generally available. 3/4" Umatic tapes cannot be played in 3/4" Umatic SP decks. 3/4" Umatic SP tapes can be played on regular 3/4" Umatic decks, but without any improvement to the picture.

PRIMARY USAGE ➤ The 3/4" Umatic format was developed for industrial and educational markets. In the 1970s and 1980s it was widely used for electronic news gathering, and up through the 1990s, it was a primary format for many artists, community activists, academic institutions, and production houses. Many artist and community videos are in this format; it was a preferred format for edit masters in the 1980s.

RISKS ➤ Older 3/4″ Umatic tapes, such as those from the 1970s and 1980s, are at great risk of signal loss due to problems with the physical material. Newer tapes may be in better shape, but hardware and media obsolescence is still a major issue. See Risks.

CONDITION ASSESSMENT ➤ Given that 3/4" Umatic has been in use since 1971, a tape you encounter can be over 30 years old, or relatively new. Determining the age of the tape will help you judge its condition. Newer tapes can be played back for examination of picture and sound quality. For older tapes, extensive inspection is difficult without playback, though assessment can be made for

Identification

➤3/4" Umatic and 3/4" Umatic SP

ALTERNATE CASE ➤

CASE LATCH ➤

TWO SIZES ➤

signs of binder deterioration, mold, and other problems. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Re-mastering is recommended through an experienced vendor. Cleaning may be needed before transfer. Re-housing of the original may be required. See Conservation Actions.

RESOURCES ➤ The following web sites have additional information on 3/4" Umatic.

Experimental Television Project Video History Project – Tools – http://www.experimentaltvcenter.org/history/tools/tools.html
Experimental Television Project Video History Project – Preservation – http://www.experimentaltvcenter.org/history/preservation/preservation.php3
BAVC Video Preservation Resources – Hardware – http://www.bavc.org/preservation/dvd/resources/hardware.htm
Vidipax – http://www.vidipax.com
LabGuy's World – http://www.labguysworld.com/

See also Resources.

Identification

➤ Betamax

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ Betamax (aka Beta)

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ 1975

DATES IN USE ➤ 1975 to late 1980s in the US

TAPE WIDTH ➤ 1/2"

CASSETTE DIMENSIONS ➤ 6 1/8" x 3 3/4" x 15/16"

TAPE CONTAINER ➤ The most common containers are paperboard or plastic sleeves, although they can be found in hard plastic containers. (Sleeves do not significantly alter the dimensions.)

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Cassettes are typically made from gray or black plastic, with white hubs, and a clear window that shows only the left-hand reel. The Greek symbol for Beta can be found imprinted in the upper right corner of cassette (Sony) or on the left side of the cassette spine (Scotch). Beta is now also used as a generic term for Betacam tape.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Scotch and others.

TAPE PLAYERS/RECORDERS ➤ Betamax was a short-lived format in the US, quickly losing its place in the consumer market to VHS. Production of the decks continued until 2002 in the PAL format (a recording standard used in Europe). In the US, few decks survive, especially in working order. They are found primarily with preservation/restoration vendors, media arts centers, schools, and with artists and collectors. It is difficult to find parts or people to repair these decks.

Identification

➤ Betamax

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

PRIMARY USAGE ➤ The Betamax format was developed for the consumer, industrial, and educational markets. Although Betamax lost in the consumer marketplace in the US, this format was considered to be technically superior to VHS and was used extensively in schools, community media centers, and by artists.

RISKS ➤ Due to its sheer age, Betamax is at great risk of signal loss due to problems with the physical material, and from hardware and media obsolescence. See Risks.

CONDITION ASSESSMENT ➤ Extensive inspection is difficult without playback, though assessment can be made for signs of binder deterioration, mold, and other problems. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Re-mastering is recommended through an experienced vendor. Cleaning may be needed before transfer. Re-housing of the original may be required. See Conservation Actions.

RESOURCES ➤ The following web sites have additional information on Betamax.

Vidipax – http://www.vidipax.com
Betamax Video Tape Explained – http://www.high-techproductions.com/betamax.htm

See also Resources.

Identification

➤ VHS and S-VHS

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ VHS and S-VHS

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ VHS – 1976
➤ S-VHS – 1987

DATES IN USE ➤ VHS – 1976 to present
➤ S-VHS – 1987 to present

TAPE WIDTH ➤ 1/2"

CASSETTE DIMENSIONS ➤ 7 3/8" x 4 1/16" x 1" for both VHS and S-VHS.

TAPE CONTAINER ➤ The most common containers are hard plastic snap-closure boxes measuring 8" x 4 11/16" x 1 1/8", but tapes can also be found in paperboard or plastic sleeves.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Cassettes are typically made from black plastic, with white hubs, and clear windows that show both reels. A VHS (or S-VHS) logo is usually imprinted on the cassette in the upper right-hand corner, while manufacturer name is imprinted in the upper left. S-VHS tapes have an additional hole on the back of the cassette.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Panasonic, JVC, Fuji, Maxell, and others.

TAPE PLAYERS/RECORDERS ➤ Decks for VHS are still in wide use, primarily in consumer markets. However, use is in decline due to widespread distribution of mainstream film on DVD. S-VHS gives a superior picture to standard VHS, and has other technical advantages. VHS and S-VHS are referred to as 'upward compatible': VHS tapes can be played in S-VHS decks, but tapes recorded in

Identification

➤VHS and S-VHS

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

S-VHS will not play in standard VHS decks. Users can choose multiple speeds for recording on tapes from 10 – 120 minutes long.

PRIMARY USAGE ➤ The VHS format was developed for the consumer market, whereas S-VHS was geared towards consumer, industrial, and educational markets. VHS was initially used as a camera and mastering format, but more recently has been used primarily for distribution (for multiple viewing copies/dubs). S-VHS was also used as a camera and mastering format. In art and education sectors, it was largely supplanted by digital video in the 1990s.

RISKS ➤ VHS tapes from the 1970s and 1980s are at great risk of signal loss due to problems with the physical material. See Risks.

CONDITION ASSESSMENT ➤ Given that VHS has been in use since 1976, a tape you encounter can be over 25 years old, or relatively new. Determining the age of the tape will help you judge its condition. Newer tapes can be played back for examination of picture and sound quality. For older tapes, extensive inspection is difficult without playback, though assessment can be made for signs of binder deterioration, mold, and other problems. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Given the length of time these formats have been in use, conservation actions should be based on age and condition assessment. For older tapes, re-mastering is recommended. Cleaning may be needed before transfer. Re-housing of the original may be required. See Conservation Actions.

Identification

➤ Betacam and BetacamSP

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ Betacam and BetacamSP (aka Beta)

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ Betacam – 1982
➤ BetacamSP – 1986

DATES IN USE ➤ Betacam – 1982 to present
➤ BetacamSP – 1986 to present

TAPE WIDTH ➤ 1/2"

CASSETTE DIMENSIONS ➤ Large cassettes are 9 5/16" x 5 11/16" x 1. They are used in recording and editing decks, and will record up to 194 minutes in length. Small cassettes measure 6 1/8" x 3 3/4" x 15/16" and are for use in cameras, recording up to 62 minutes in length.

TAPE CONTAINER ➤ Most common tape containers are hard plastic snap-closure boxes. Large cassette cases are 10 5/8" x 6 3/8" x 1 1/4". Small cassette cases are 6 3/4" x 4 3/8" x 1 3/16".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tape cassettes are generally labeled in the upper right-hand corner as Betacam or BetacamSP. Tape length is often written on the anti-static cover (door) that retracts to reveal the tape. Sony cassettes are dark blue with a black anti-static cover, and Maxell cassettes are dark gray with purple anti-static cover. Note: small Betacam and BetacamSP cassette tapes are the same size as Betamax tapes, so look carefully for a distinguishing logo.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Ampex, Fuji, Maxell and others.

Identification

➤Betacam and BetacamSP

IDENTIFYING MARKS ➤

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

TAPE PLAYERS/RECORDERS ➤ BetacamSP (Superior Performance) has technical advantages over Betacam. Betacam decks are no longer in production, but BetacamSP decks continue to be manufactured in a limited line. Betacam and BetacamSP are referred to as 'upward compatible': Betacam tapes can be played in BetacamSP decks, but tapes recorded in BetacamSP will not play in standard Betacam decks. Also, most newer decks in the Betacam family, such as Digital Betacam decks, will play BetacamSP tapes. Betacam and BetacamSP tape stocks are still available.

PRIMARY USAGE ➤ The Betacam and BetacamSP formats were developed for broadcast industrial, educational, and professional markets. BetacamSP has been used extensively as a broadcast format, and as a mastering format by commercial and independent producers, and by artists. It has been used as an exhibition format for artists, and a collections format for distributors of independent media. BetacamSP has also been a common choice for preservation masters in the last 10-15 years.

RISKS ➤ Betacam formats and decks are considered to be very durable, and parts are still available. However, Betacam runs the same risk of signal loss as other formats, due to problems with the physical material itself. Playback for Betacam will become more of an issue if BetacamSP is discontinued. However, it is expected that Sony will technically support the line for a period of years after manufacturing ceases. The obsolescence of Betacam is less of an issue as long as newer decks such as Digital Betacam continue to be options for playback.

Identification

➤ Betacam and BetacamSP

TWO SIZES ➤

CONDITION ASSESSMENT ➤ A Betacam or BetacamSP tape you encounter can be 15-20 years old, or relatively new. Determining the age of the tape will help you judge its condition. Most tapes can be played back for examination of picture and sound quality. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Actions should be based on age and condition assessment. For many in the archival and conservation fields, Betacam SP is still an option for preservation masters, rather than a format needing re-mastering. See Conservation Actions.

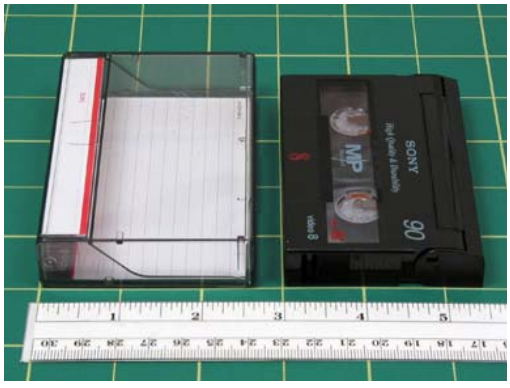
Identification

➤ Video8 and Hi8

FRONT ➤

BACK ➤

CASE ➤



FORMAT NAME ➤ Video8 (aka 8mm) & Hi8

ANALOG OR DIGITAL ➤ Analog

DATE INTRODUCED ➤ Video8 – 1984
➤ Hi8 – 1989

DATES IN USE ➤ Video8 – 1984 to present
➤ Hi8 – 1989 to present

TAPE WIDTH ➤ 5/16" (8mm)

CASSETTE DIMENSIONS ➤ 3 11/16" x 2 3/8" x 9/16" for both Video8 and Hi8.

Tape container: Most common tape containers are heavy-duty clear plastic hinged boxes or heavy-duty plastic snap-closure boxes - 4" x 2 5/8" x 3/4". Some tapes (i.e. Fuji) are in a plastic sleeve.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tape cassettes are the same size. They are usually labeled in the bottom middle of the cassette (between the two reels) as 8mm or Hi8.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Panasonic, Fuji, and others.

TAPE PLAYERS/RECORDERS ➤ Decks for Video8 and Hi8 formats are still in use, are still being produced and marketed, and are readily available. However, digital formats (such as MiniDV) have overtaken much of the Video8 and Hi8 market, raising questions as to how long these formats will be supported. Hi8 gives a superior picture to Video8, and has other technical advantages. Video8 and Hi8 are referred to as 'upward compatible':

Identification

➤Video8 and Hi8

IDENTIFYING MARKS ➤

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

Video8 tapes can be played in Hi8 decks, but tapes recorded in Hi8 will not play in standard Video8 decks. Both formats can also be played in Digital 8 decks.

PRIMARY USAGE ➤ The Video8 format was developed for the consumer market, where it was widely used through the late 1980s and 1990s. Hi8 was geared towards consumer, industrial, and educational markets. Usage of Hi8 in industrial and educational markets has decreased as use of digital formats (such as MiniDV) has increased. However, for much of the 1990s, Hi8 was a popular format for artists, community video centers, the media arts, and colleges/universities. In the consumer market Video8 is the lowest cost format, followed by Hi8, with digital formats priced higher. This may account for the format's continuing popularity.

RISKS ➤ Video8 and Hi8 are made from thin tape that is subject to stretching. The shorter tapes – 30 and 60 min. - are more durable than the longer tapes. Users have reported dropout soon after the first recording. Metal Evaporated (ME) tape particularly is reported to have durability problems. Also, market factors suggest that Video8 and Hi8 will be phased out, in favor of digital formats. Unfortunately, due to the size, the decks are not as durable as those of larger formats, are difficult to work on, and thus are more expensive to repair relative to their cost. These factors may affect the availability of decks as these formats are phased out. On the positive side, the recent introduction of Digital 8 decks offers a new playback option. See Risks.

CONDITION ASSESSMENT ➤ Since Video8 tapes could be approaching 20 years old, determining the age of the tape will help you judge its condition. ME tapes (see above)

Identification

➤ Video8 and Hi8

IDENTIFYING MARKS ➤

should be identified. Newer tapes can be played back for examination of picture and sound quality; however, if dropout or other tape problems are observed, playback should stop until the point of re-mastering. For older tapes, extensive inspection is difficult without playback, and it will be wise to err on the side of caution. See Risks and Condition Assessment.

CONSERVATION ACTIONS ➤ Although these formats are relatively new, they are fragile and do not appear to have a very long shelf life. Re-mastering is recommended as soon as possible. Re-housing of the original may be required. See Conservation Actions.

Identification

➤ D2

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ D2

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1988

DATES IN USE ➤ 1988 to present

TAPE WIDTH ➤ 3/4"

CASSETTE DIMENSIONS ➤ Medium cassettes are 10" x 5 7/8" x 1 5/16" and small cassettes are 6 3/4" x 4 1/4" x 1 5/16". Medium cassette pictured.

TAPE CONTAINER ➤ Most common tape containers are hard plastic snap-closure boxes measuring 11 1/4" x 6 13/16" x 1 9/16".for medium cassettes and 7 3/4" x 5 1/16" x 1 9/16". Small box pictured.

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tape cassettes are typically gray and are generally labeled with the name in the upper right-hand corner.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Ampex and others.

TAPE PLAYERS/RECORDERS ➤ D2 is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available. However, the decks are very expensive so in-house playback is not available within the non-profit cultural community.

PRIMARY USAGE ➤ Introduced in the late 1980s, D2 was among the first digital tape formats for high-end production. D2 was developed for the high-end professional market, and has been used as a mastering

Identification

➤D2

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

TWO SIZES ➤

format in such areas as advertising, television programming, and corporate applications. Artists working within a television setting may have mastered to D2.

RISKS ➤ It is difficult to predict how long D2 will be supported, considering the "format wars" among digital tape manufacturers. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape. See Risks.

CONDITION ASSESSMENT ➤ Most D2 tapes can be played back for examination of picture and sound quality, however equipment availability may be an issue. See Condition Assessment.

CONSERVATION ACTIONS ➤ D2 is not recommended as an archival video format, but given the age and durability of the media, re-mastering is not an immediate need. See Conservation Actions.

Identification

➤ D3

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ D3

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1990

DATES IN USE ➤ 1990 to present

TAPE WIDTH ➤ 1/2"

CASSETTE DIMENSIONS ➤ 8 1/4" x 4 7/8" x 15/16".

TAPE CONTAINER ➤ Most common tape containers are hard plastic snap-closure boxes measuring 9 1/16" x 5 5/8" x 1 1/4"

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tape cassettes are typically gray and are generally labeled with the name in the upper right-hand corner.

COMMON MANUFACTURERS/BRANDS ➤ Panasonic and others.

TAPE PLAYERS/RECORDERS ➤ D3 is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available. However, the decks are very expensive so in-house playback is not available within the non-profit cultural community.

PRIMARY USAGE ➤ D3 was developed for the high-end professional market, with longer tapes and costs somewhat less than with D2. D3 has been used as a mastering format in such areas as advertising, television programming, and corporate applications. Artists working within a television setting may have mastered to D3.

RISKS ➤ It is difficult to predict how long D3 will be supported, considering the "format

Identification

➤D3

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

wars" among digital tape manufacturers. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape. See Risks.

CONDITION ASSESSMENT ➤ Most D3 tapes can be played back for examination of picture and sound quality, however equipment availability may be an issue. See Condition Assessment.

CONSERVATION ACTIONS ➤ D3 is not recommended as an archival video format, but given the age and durability of the media, re-mastering may not be an immediate need. See Conservation Actions.

Identification

➤ Digital Betacam

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ Digital Betacam (aka DigiBeta)

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1993

DATES IN USE ➤ 1993 to present

TAPE WIDTH ➤ 1/2"

CASSETTE DIMENSIONS ➤ Large cassettes are 9 5/16" x 5 11/16" x 1, and are for use in recording and editing decks. They will record up to 194 minutes in length. Small cassettes measure 6 1/8" x 3 3/4" x 15/16" and are for use in cameras, recording up to 62 minutes in length.

TAPE CONTAINER ➤ Most common tape containers are hard plastic snap-closure boxes. Large cassette cases are 10 5/8" x 6 3/8" x 1 1/4". Small cassette cases are 6 3/4" x 4 3/8" x 1 3/16".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tape cassettes are light gray blue (Sony and Maxell) and are generally labeled as Digital Betacam in the upper right-hand corner, and 'for Digital' in the upper left corner. Tape length is often written on the anti-static cover (door) that retracts to reveal the tape.

COMMON MANUFACTURERS/BRANDS ➤ Sony.

TAPE PLAYERS/RECORDERS ➤ Digital Betacam is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available. Digital Betacam decks will also play Betacam SP tapes. The decks are very expensive so in-house playback is generally not available within the non-profit cultural community.

Identification

➤ Digital Betacam

IDENTIFYING MARKS ➤

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

PRIMARY USAGE ➤ Digital Betacam was developed for the professional market. It is widely in use, especially in industrial and professional sectors. It is the industry standard in electronic newsgathering and broadcast television, and as a mastering format in advertising, high-end television programming, and corporate applications. It is also used as a format for video preservation masters.

RISKS ➤ With any newer video format, it is difficult to predict how long the format will be supported. Digital Betacam's market share implies that it will not be phased out in the near future. A positive trend is that as Sony continues to introduce new formats for the broadcast market, they are also introducing decks that will play back multiple formats from the Betacam family. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape. See Risks.

CONDITION ASSESSMENT ➤ Most Digital Betacam tapes can be played back for examination of picture and sound quality, however equipment availability may be an issue. See Condition Assessment.

CONSERVATION ACTIONS ➤ For many in the archival and conservation fields, Digital Betacam is the best choice for preservation masters, and so is generally considered to be a solution, rather than a problem requiring action. See Conservation Actions.

Identification

➤DVCAM

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ DVCAM

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1995

DATES IN USE ➤ 1995 to present

TAPE WIDTH ➤ 1/4”

CASSETTE DIMENSIONS ➤ Large cassettes measure 4 7/8" x 3" x 9/16" They are used in editing decks and will record up to 184 minutes in length. Small cassettes measure 2 9/16" x 1 7/8" x 9/16", and are used in cameras to record up to 40 minutes in length.

TAPE CONTAINER ➤ Most common tape containers are hard plastic snap-closure boxes. Large cassette cases are 5 3/8" x 3 11/16" x 3/4". Small cassette cases are 3 1/16" x 2 1/2" x 3/4".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Tapes are generally bluish gray and are labeled as DVCAM in the upper right-hand corner. Large cassettes generally have a black anti-static cover, whereas small cassettes generally have a light blue anti-static cover.

COMMON MANUFACTURERS/BRANDS ➤ Sony.

TAPE PLAYERS/RECORDERS ➤ DVCAM is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available.

PRIMARY USAGE ➤ The DVCAM format was developed by Sony for industrial, educational, and professional markets. It is used extensively for electronic news gathering, cable television, and other field production. It is also used as a mastering format by artists

Identification

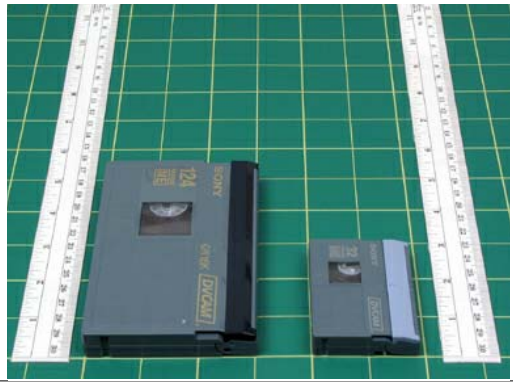
➤DVCAM

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

TWO SIZES ➤



and independent producers, especially for long-form programming (such as documentaries), because the maximum tape length on a single cassette is 184 minutes.

RISKS ➤ With any newer video format, it is difficult to predict how long the format will be supported. However, DVCAM's market share implies that it will not be phased out in the near future. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape, and the size and durability of DVCAM is a concern. However, DVCAM is a higher quality product than older mini formats, such as Hi8; it is comparable to DVCPro. See Risks.

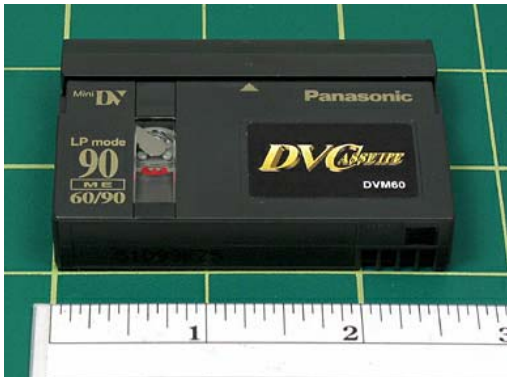
CONDITION ASSESSMENT ➤ Most DVCAM tapes can be played back for examination of picture and sound quality. See Condition Assessment.

CONSERVATION ACTIONS ➤ DVCAM is not an archival video format, but given the age of the media, re-mastering may not be an immediate need in the context of an institution's overall media preservation plans. See Conservation Actions.

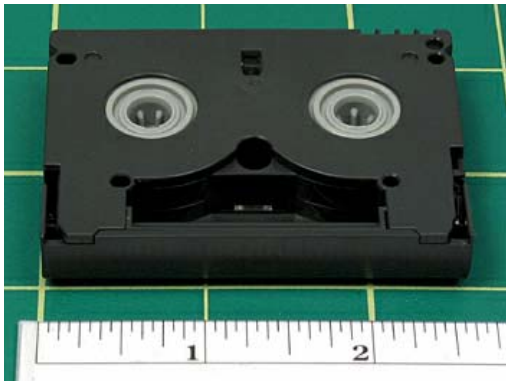
Identification

➤MiniDV

TOP ➤



BOTTOM ➤



CASE ➤

FORMAT NAME ➤ MiniDV (aka DV or DVC)

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1995

DATES IN USE ➤ 1995 to present

TAPE WIDTH ➤ 1/4”

CASSETTE DIMENSIONS ➤ 2 9/16" x 1 7/8" x 7/16"

TAPE CONTAINEr ➤ Most common tape containers are heavy-duty clear plastic hinged boxes - 2 7/8" x 2" x 5/8".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ This format was originally called DV, but is commonly known as MiniDV. Tape cassettes are generally labeled in the lower left hand (Sony) or on a sticker on the right side (Panasonic). Note that all MiniDV designations for Panasonic tapes are on stickers or the packaging, and may be covered with labels that list title or production information.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Panasonic, and others.

TAPE PLAYERS/RECORDERS ➤ MiniDV is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available. MiniDV uses the same tape width and signal compression as DVCAM tapes, but they record at different speeds. MiniDV tapes can be played in most DVCAM decks, but tapes recorded in DVCAM cannot be played back on a MiniDV camera or deck.

PRIMARY USAGE ➤ The MiniDV format was developed for consumer, industrial, and

Identification

➤ MiniDV

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

educational markets. It is used extensively by artists and community activists, both in the educational sector and in independent production. Its small size and high visual quality make it popular for field acquisition (camera recording).

RISKS ➤ With any newer video format, it is difficult to predict how long this format will be supported. However, MiniDV's market share implies that it will not be phased out in the near future. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape. The size and durability of MiniDV, as with any small, thin tape, is a concern, with similar issues to Hi8. See Risks.

CONDITION ASSESSMENT ➤ Most MiniDV tapes can be played back for examination of picture and sound quality. See Condition Assessment.

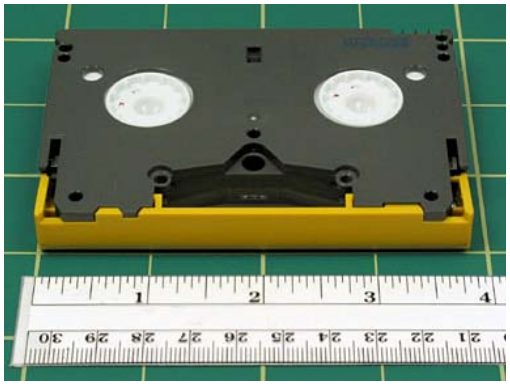
CONSERVATION ACTIONS ➤ MiniDV is not an archival video format and will need to be considered for re-mastering. See Conservation Actions.

Identification

➤ DVCPro

TOP ➤

BOTTOM ➤



CASE ➤

FORMAT NAME ➤ DVCPro (aka D7)

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1995

DATES IN USE ➤ 1995 to present

TAPE WIDTH ➤ 1/4”

CASSETTE DIMENSIONS ➤ Large cassettes measure 4 7/8" x 3" x 9/16". They are used in editing decks and will record up to 126 minutes in length. Medium cassettes measure 3 13/16" x 2 1/2" x 9/16", and are used in cameras to record up to 66 minutes in length. Note: Medium cassette pictured.

TAPE CONTAINER ➤ Tape containers are hard plastic snap-closure boxes. Large cassette cases are 5 1/4" x 3 5/16" x 3/4". Medium cassette cases are 4 1/8" x 2 3/4" x 3/4".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Cassettes are generally dark gray with a yellow anti-static cover (Panasonic) or black with a yellow anti-static cover (Maxell) or black with a red anti-static cover (Fuji). DVCPro logo is in the upper right-hand corner, and tape length is generally listed on left. Panasonic cassettes also designate large cassettes with the letter 'L' after tape length (i.e. 126L).

COMMON MANUFACTURERS/BRANDS ➤ Panasonic, Maxell, Fuji.

TAPE PLAYERS/RECORDERS ➤ DVCPro is a relatively new format, so decks are in use, are still being produced and marketed, and are readily available.

Identification

➤ DVCPro

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

PRIMARY USAGE ➤ The DVCPro format was developed by Panasonic for industrial, educational, and professional markets. It is used for electronic news gathering, cable television, and other field production, including independent production. One of the first small digital formats, it was initially popular, but more recently has lost ground to other DV products.

RISKS ➤ The DVCPro format uses the same tape width and compression rate as DVCAM, but the cassette housing is different, and it is not fully compatible with other digital video (DV) products. DVCPro decks will play MiniDV and DVCAM tapes; however, few DVCAM decks will play DVCPro tapes. Considering these "format wars," the future of DVCPro is unknown. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape, and the size and durability of DVCPro is a concern. However, DVCPro is a higher quality product than older mini formats, such as Hi8. See Risks.

CONDITION ASSESSMENT ➤ Most DVCPro tapes can be played back for examination of picture and sound quality. See Condition Assessment.

CONSERVATION ACTIONS ➤ DVCPro is not an archival video format, but given the age of the media, re-mastering may not be an immediate need in the context of an institution's overall media preservation plans. See Conservation Actions.

Identification

➤ Digital 8

TOP ➤

BOTTOM ➤

CASE ➤

FORMAT NAME ➤ Digital 8

ANALOG OR DIGITAL ➤ Digital

DATE INTRODUCED ➤ 1999

DATES IN USE ➤ 1999 to present

TAPE WIDTH ➤ 5/16" 8mm

CASSETTE DIMENSIONS ➤ 3 11/16" x 2 3/8" x 9/16".

TAPE CONTAINER ➤ Most common tape containers are heavy-duty clear plastic hinged boxes or heavy-duty plastic snap-closure boxes - 4" x 2 5/8" x 3/4".

TAPE VARIATIONS AND/OR IDENTIFYING FEATURES ➤ Digital 8 is recorded on standard Hi8 tapes. The cassettes are generally labeled in the bottom middle of the cassette (between the two reels) as Hi8. There may not be any distinguishing marks to indicate that the recording is in Digital 8, though ME (metal evaporated) tapes are often used because Digital 8 records at faster head speeds.

COMMON MANUFACTURERS/BRANDS ➤ Sony, Panasonic, Fuji, and others.

TAPE PLAYERS/RECORDERS ➤ Digital 8 is a relatively new format, so decks are still in use, are still being produced and marketed, and are readily available.

PRIMARY USAGE ➤ The Digital 8 format was developed for the consumer market, and is sometimes used in the educational sector. Digital 8 cameras are marketed primarily to

Identification

➤Digital 8

IDENTIFYING MARKS ➤

SAFE MODE ➤

RECORD MODE ➤

consumers who already had 8mm or Hi-8 tapes - which could be played on the Digital 8 cameras.

ADDITIONAL TECHNICAL INFORMATION ➤ Video 8 and Hi8 tapes can be played in Digital 8 decks, but tapes recorded in Digital 8 will not play on Video8 or Hi8 decks.

RISKS ➤ With any newer video format, it is difficult to predict how long this format will be supported. Digital 8 has a marginal market share when compared to mini-DV. In terms of physical characteristics, digital tape has the same issues with deterioration as analog tape. Hi8 are made from thin tape that is subject to stretching. The shorter tapes – 30 and 60 min. - are more durable than the longer tapes. Users have reported dropout soon after the first recording. Metal Evaporated (ME) tape particularly is reported to have durability problems. Unfortunately, due to the size, the decks are not as durable as those of larger formats, are difficult to work on, and thus are more expensive to repair relative to their cost. These factors may affect the availability of decks as these formats are phased out. See Risks.

CONDITION ASSESSMENT ➤ Most Digital 8 can be played back for examination of picture and sound quality; however, if dropout or other tape problems are observed, playback should stop until the point of re-mastering. See Condition Assessment.

CONSERVATION ACTIONS ➤ Although these formats are relatively new, they are fragile and do not appear to have a very long shelf life. The need for re-mastering will need to be evaluated. See Conservation Actions.

Risks to Videotape Longevity

Videotape was manufactured for short-term production use, not as an archival medium for the long-term. Information about risks to videotape is largely anecdotal; very few controlled studies have been done. Dr. John W.C. Van Bogart, in the 1995 publication *Magnetic Tape Storage and Handling: A Guide for Libraries and Archives*, estimates a maximum life expectancy of thirty years for magnetic tape. (See Resources section.) In practice, useful shelf life depends on such variables as tape format and/or brand, storage conditions, number of recordings, tape handling, and conditions of playback. Periodic condition assessments and conservation actions can help slow deterioration and improve the chances of having viable information once an older tape is transferred to a contemporary format.

Below are basic descriptions of common risks; for more information, consult the Resources and Sources sections of this document.

Equipment and media obsolescence and fragility

Since videotape is dependent on playback equipment to be seen and heard, the loss of this equipment creates the greatest risk. Format identification will help you establish whether playback equipment is available for tapes in your collection. For example, some formats, such as 2" quadruplex, have been obsolete for over 25 years, so equipment, parts, and experienced technicians for formats are difficult to find. Some tape formats require specific machines to playback properly; for example, not all 3/4" Umatic tapes will play back on the same Umatic deck. The media or tape formats are also changing. One only needs to remember laser disks – marketed as a revolutionary new format – as a recent example of media obsolescence.

Machines that play back small tape formats are not considered durable; the same can be said about the tapes themselves. Formats such as 8mm and Hi8 fall into this category - thin tape in a tiny container. In addition, small decks, developed for the consumer or "pro-sumer" market, are difficult to work on, considered more consumable, and often expensive to repair relative to their original value.

Common chemical deterioration

Simply speaking, most videotape is composed of iron oxide particles imbedded in a binder on a base film of polyester terepthalate (PET). The binder is actually composed of a number of different substances, the primary one being polyester polyurethane – but different tape manufacturers created different formulations. These different formulations make some tapes more susceptible to deterioration than others.

The most common problem with videotape deterioration is sticky shed syndrome, where the binder absorbs moisture and undergoes chemical changes through a process called hydrolysis. These changes cause the binder and magnetic particles to become sticky and to detach, or shed, from the base film. When these substances are shed during playback, the machine can stop playing altogether.

Some older tapes may be found to have an acetate base. Acetate is subject to vinegar syndrome, where the base decomposes and creates acidic acid. High temperatures hasten the process of deterioration, whether vinegar syndrome or sticky shed syndrome. Cool, dry storage will slow chemical deterioration.

Risks to Videotape Longevity

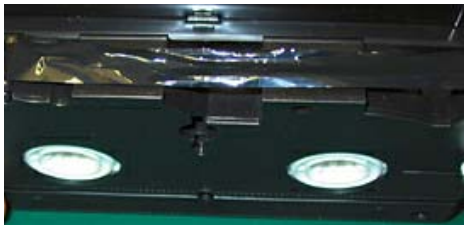
Newer tapes have different problems. For example, "metal evaporated" tapes, common in small formats like Hi8, have been seen to have corrosion problems, leading to a different type of metal oxide "shedding" with the same result - the loss of oxides leads to signal loss. See risks associated with particular formats in the format identification section.

Mold

Humid, warm conditions can promote the growth of mold on tape surfaces. Moldy tapes will require specialized handling and cleaning. Since mold can be toxic, care should be taken during tape inspection.

Mechanical damage

Playback of videotapes on inferior or improperly maintained equipment can damage or stretch a tape, resulting in signal loss. An uneven tape pack can also be created through the use of poor playback, subjecting the tape to possible edge damage and playback errors.



damaged tape

Improper care and handling

Precarious storage or careless handling can cause damage to the tape cassettes, such as cracks and breakage, or can result in creased or twisted tape. Tapes kept in dusty, dirty conditions will accumulate particulate matter. This tape debris can interfere with the signal being read by the playback deck, resulting in dropout - the loss of magnetic particles. Debris on a tape can also be deposited on the tape path of a playback machine. Careless handling can also transfer oils and other chemical compounds to the tape. Ultraviolet light, particularly direct sunlight, is also damaging to videotape.

poor tape pack

Poor housing also creates a risk for videotape. Paperboard tape cases create dust as they deteriorate, and paper materials tend to hold moisture and become more acidic with time. Tapes without cases obviously have no protection from particulate matter.

tape down ends of open reels

Tapes that are not re-wound after use, or those that are stacked horizontally instead of stored on edge, are subject to pack problems. Overtime, the tape pack can become uneven, exposing tape edges to possible damage, and making playback more difficult. Important information is held near the edges of

magnetic tape. In the case of open reel tapes, those not taped down at the end will become loose over time. These loose ends tend to fold over or deform. Loose tapes are also more susceptible to dirt and dust entering the tape pack.

proper storage

improper storage

Unintended recording

All cassette videotapes are designed to have a mode in which they can be recorded, and one in which they cannot. This is accomplished through a button or tab on the side or bottom of a tape that is detected by a video recorder. Often many tapes in a collection will come from the donor unprotected, and could be inadvertently recorded over. See identification pages to distinguish between tapes that are protected and unprotected. There is no such protection for open reel tapes.

3/4" U-Matic in protected mode

Magnetic fields

A tape's signal (the information carrier) is represented on a tape by the arrangement of the magnetic particles into a particular pattern. Strong magnetic fields can affect the signal on a tape, causing it to become unreadable or adding to errors in playback. Common mistakes include leaving tapes on top of, or next to, a television, computer monitor, speaker, or microphone. Motors, transformers, generators, and industrial cleaning equipment are other devices that can cause demagnetization if a tape is within close proximity.

In recent years, there has been more discussion about transporting videotapes through airport security. It has been reported that airport scanning devices for checked baggage are damaging to videotapes. Biological decontamination devices are also reported to be damaging. Should these risks apply in the work of your organization, it is recommended that you keep current on these topics through such resources as AMIA-L, the listserv of the Association of Moving Image Archivists.

Unwise decisions about duplication

Videotapes often exist in multiples; many copies may be made from a single edit master or original recording. Several different organizations may hold the same works in different formats, in different generations, and the tapes may be in different conditions. An artist/producer may retain an original or

master on professional stock such as BetacamSP, while an organization holds a viewing copy on a lower quality format such as VHS.

The image quality of an analog tape degrades each time a copy is made. Although digital tape copies are called "clones," errors may occur as tapes are transferred, causing artifacts, or image distortions. If an inferior tape is re-mastered, or the preservation process is unprofessional, the result may be a version that is substantially degraded, and substantially altered from the artist/producer's original work.

Inadequate description or documentation

Videotapes are typically minimally labeled, and often the case and tape contain different information. Also, tape labels commonly peel off and become separated from the tapes. As time passes, the label information often has less meaning to the preservationist or researcher in and of itself. Additional information can be gained from watching the tape, but as a tape ages, playback becomes more risky, making description even more difficult. Tapes without adequate description become low priorities for preservation, and are at increased risk of being lost through benign neglect. Also, one can waste precious preservation funds re-mastering tapes that are of lesser value, because time was not spent properly describing the tape at an earlier point in its life cycle.

labels may be loose in cases

Condition Assessment

Background

In general, this guide is oriented toward an initial, external examination of videotapes to notice significant physical problems, or to identify classes of tapes that can be assumed to be at risk. Understanding risks to videotape will provide helpful background. Once you have finished your inspection, you can take appropriate conservation actions. Since on a practical level inspection and simple conservation actions (such as re-housing) are often done at the same time, you may find it helpful to read through that section before you begin.

If you have a large collection, treatment of the tapes will need to be done in stages. A thorough examination of the tapes will help determine priorities for preservation. Priorities often develop from an assessment of age, condition, and significance or value.

Identification of tape formats is the first step to condition assessment, giving clues to age and condition, as well as alerting you to special characteristics of a particular type of tape. For example, if you have 2" quadruplex tapes in your collection, they can be assumed to be in poor condition simply due to age. Also, the fact that 2" equipment is rare will cause this format to be a high priority for preservation, regardless of condition. An initial inventory of your collection by tape format will also be helpful in creating an overall plan and budget for preservation projects.

External inspection is valuable for many reasons. For example, the inspection will tell you whether you need to hire an expert in disaster recovery, or a vendor with more general experience. Inspection will allow you to gauge whether or not the materials have particular damage, such as mold, that may be a health hazard for staff. You may discover vinegar syndrome, which has the potential to put other works at risk of contamination.

Newer tape formats with no external evidence of damage can be screened to give further information about condition. You will want to use a well-maintained and calibrated machine for this purpose. However, it is difficult for the untrained eye to make sense of errors common in tape recording and playback. Also, older recordings may look "soft," or have glitches that were common given technological limitations of the time. Furthermore, some effects that mimic tape problems may represent purposeful actions by an artist. A media specialist and/or discipline specialist will be helpful to consult with during the inspection process.

However, problems with older tapes will not always be evident from an external visual examination. Playing back older tapes could cause further damage, especially if they are not cleaned first, or they are played back on a machine that is not well maintained. If there is a question about condition, err on the side of caution and do not play the tape until it is re-mastered. Tape condition should be evaluated and addressed during transfer to a contemporary medium.

As noted in the Risks section, there have been few scientific studies concerning videotape longevity. Best practices have evolved primarily from practical experience, advice from engineers and other technical experts, and from manufacturers. For more information, see the Resources and Sources sections.

Set-up for inspection

Determine how you will record the information you gain from the inspection. The best approach is to enter it into a field in a computer catalog or collection management system. Record at a minimum the

date, tape number, tape title, format, tape brand, conditions found, and the name of the person recording the information.

Work on a clean, dry surface. Covering a table with clean paper is a good approach. Lint-free cotton gloves are used by some preservationists, both to protect one's hands and to protect the tape itself. However, some people find it difficult to work with gloves on, and are concerned with transferring debris from the gloves to the tape as they handle the cases and other materials. Let common sense guide you. Gloves are not necessary when handling cassette tapes, because the tape surface is not exposed; however, open reel tapes are very vulnerable. Nevertheless, gloves and facemasks should be on hand for handling problematic tapes such as those with mold. In any case, your hands should be clean and dry before handling videotape, and free from hand lotions and oils. Wash your hands as frequently as needed to maintain cleanliness.

Examine the tape case

Tape cases will give clues to tape condition. If the case is dirty, use a lint-free cloth to wipe the surfaces of the tape case before opening it. This will avoid further contamination of the tape with particulate matter. The inside of the case may also have debris and dirt that can be removed with a lint-free cloth or through the use of compressed air.

clean case before opening

A tape case may be bent or broken, suggesting rough handling. If the case looks water-damaged, you will want to check carefully for mold or evidence of water damage on the tape. Also, note the condition of any tape or case labels, and secure the labels if necessary. Note the presence of paper materials that will need to be organized during re-housing.

Examine the tape

Work with gloves and possibly a facemask if a tape looks or smells suspicious. Examine the tape at arm's length first, rather than bringing it up close to your face. Waving your hand over the tape can help the odor come to you; don't bring the tape up to your nose.

If the tape is damp or wet, contact a professional immediately. See also "Video Preservation Facts Sheets" listed in Resources. Before picking the tape up, look for signs of mold. There are many types of mold; small white or brown strands or filaments have been reported as signs of mold on videotape. If you think the tape is moldy, it should be isolated immediately and treated by a professional.

Older tapes often have a pungent smell that has been reported to be associated with binder

latch for opening cassette - VHS

press and pull back anti-static guard - VHS

deterioration. You may smell a vinegar-like odor that is typically associated with vinegar syndrome. White or brown powder has additionally been reported as a sign of binder deterioration. Also look for particulate matter or evidence of improper handling on the tape and reel, such as dirt, dust, or fingerprints.

If there is no evidence of mold, pick up the tape and look for cracks or breakage in the cassette or reels. With cassettes, check to see if the any of the tape has come out of the cassette, or if the tape is loose around the reels. Over time, open reel tapes may become loose on the reel and begin to deform. If the deformation is not severe, securing the tape around the reel(s) will help prevent further damage.

By holding the tape at a 45° angle and looking at the horizontal surface of the reel, you may discern an uneven pack, and note edge damage. Proper storage can help prevent further damage to the tape pack.

Again, carefully record the problems you see. They will determine the conservation actions you will take.

poor tape pack

Conservation Actions

Conservation Actions

Identifying tape formats, understanding risks, and doing a condition assessment are recommended before taking conservation actions. On a practical level, inspection and simple conservation actions (such as re-housing) are often done at the same time.

As noted in the Risks section, there have been few scientific studies concerning videotape longevity. Best practices have evolved primarily from practical experience, advice from engineers and other technical experts, and from manufacturer literature. For more information, see Resources and Sources sections.

The following actions are directed toward those new to videotape preservation. They are written with the assumption that your organization does not have in-house technical expertise or the necessary equipment to do videotape cleaning or re-mastering. Before you begin a preservation project, you will want to consult others who have more experience – such as members of the key conservation/preservation organizations.

Documentation

Documenting preservation actions is essential to maintaining a history of the tape and any copies that may be generated through re-mastering. Creating a catalog or tracking the tapes in a collection management system is often the first step in a preservation project. However, often collection management systems will not have the necessary fields to describe and manage videotapes. Organizations such as Independent Media Arts Preservation and the Association of Moving Image Archivists can be helpful when developing descriptive tools.

Information recorded during a preservation project often includes such things as condition, storage history, description(s) of conservation/preservation actions, dates and individual(s) responsible, vendors, numbers of preservation master(s) and/or copies generated, tape brand(s), and technical data about the transfer. Using authority lists or glossaries for key terminology (such as tape format), even if only internal to your organization, is strongly recommended. Standardizing the type of information you collect and how it is recorded will make it much easier to manage the tape collection. Standards would ideally be developed prior to beginning a preservation project.

Maintaining/improving intellectual description

Tape labels may fall off of the cases or tapes during handling. It is important to keep the labels with the tapes, as the labels contain important information. In fact, they may represent the only available information about a tape. The label may also provide additional clues to a researcher about the time period or context in which the tape was recorded. Some repositories are scanning labels to provide a record. Paper conservators may be helpful in re-attaching labels.

You may find papers in tape cases that will help with identification and/or technical requirements. Remove the papers and store them in associated file folders. However, critical information from the papers should be entered into the computer catalog, and a note should be made in the record telling the location of the paper files. If tapes are re-housed, maintain original labels. Some organizations are starting to scan case labels or other pertinent information, creating digital image files.

Conservation Actions

As noted above, cataloging or recording tape information in a collection management system is recommended. This will often involve the recording of information from the labels, and re-numbering of the tapes with a local number.

When a tape is re-mastered, tape labels should include at a minimum the title, artist/producer, duration, original record date (if available), record date of the new tape, and the generation or type of material (such as "preservation master" or "viewing copy"). Additionally the label should indicate whether the tape is color or black and white, and should include any key audio elements; i.e., "sound, audio channels 1 & 2."

Videotape handling and housing

Familiarize yourself with risks to videotape and follow common sense – treat videos gently and protect them from hazards from the environment, machines, and people.

Inert polypropylene plastic cases are available for most video formats, and should be kept on hand, especially to house those tapes that are without cases altogether. Some repositories temporarily re-house tapes in cardboard archival (acid-free) boxes until plastic cases are available, or if they are unavailable altogether (such as for 2" quadruplex or 1"). As noted above, original labels from cases may be important to maintain. For suppliers, see the Resources section.

Plastic bags inside of tape cases are not recommended. In the case of open reel tapes, if the tape is loose, gently re-wind the tape onto the reel and secure the tape ends with a small piece of acid-free, removable tape.

wind open reels by carefully turning reel

Tapes should always be played on well-maintained, clean, and calibrated machines that are of good quality. Schedules for cleaning and maintenance should be established with the advice of a tape engineer, reputable vendor, or other video expert. Never play a tape that is cold, wet, dirty, or contaminated (such as with mold).

It is recommended that after playing videotape, it is fast-forwarded to the end and then re-wound to the beginning. It is thought that this practice results in a more consistent wind and thus, a more stable tape pack. Newer tapes can be properly re-wound; however, re-winding can be risky for tapes thought to be in poor condition. When a tape is re-mastered by a vendor, all tapes should be returned to your organization re-wound to the beginning.

secure end with acid-free tape

Addressing molds and vinegar syndrome

Tapes suspected of being moldy should be placed in plastic bags and sealed for evaluation by a professional. Conservators or other experts may be helpful in identifying a mold, or more importantly, in giving advice as to the environmental conditions – cool and dry – that will cause mold to become dormant.

Conservation Actions

A vinegar-like smell indicates that it is likely that active deterioration is occurring with acetate-based tapes. Isolating these tapes until they can be re-mastered is wise, and recommendations for cool, dry storage (see below) should be followed to slow the deterioration.

Storage

Generally accepted practices call for tapes to be stored upright on metal shelves in the dark, away from magnetic fields. Clean, secure, cool, dry storage is essential. Standards for the storage of videotape are set by the International Standard Organization for Standards (ISO 18923:2000) and are summarized in "Videotape Preservation Fact Sheets" (http://www.amianet.org/11_Information/Information.html) as follows:

proper storage

improper storage

"Acceptable extended-term storage conditions for polyester-based magnetic tape, such as videotape, are: 20°C (68°F) and 20-30% RH; 15°C (59°F) and 20-40% RH; or 10°C (50°F) and 20-50% RH. The best long-term storage temperature is approximately 8°C (46°F) (never below) and 25% RH. Humidity variation should be less than ±5% RH and the temperature variation should be less than ±2°C (±4°F) within a 24-hour period."

The "Videotape Preservation Fact Sheets" and other resources can provide detailed information about other specifics of tape storage. For example, tapes coming out of cold storage must be brought to room temperature slowly to prevent condensation and should never be placed on machines when they are cold. Use common sense and plan accordingly – avoid extremes of temperature and humidity when tapes are not able to be in proper storage (hot summer days are not the best time to ship large quantities of your collection). Learn as much as you can about your existing storage conditions - some preservationists think they are maintaining proper conditions, only to find out that the HVAC is turned off over the weekend. Regular monitoring of temperature and relative humidity is essential.

Ideally an organization will have two copies of any important videotape, and the two will be stored in separate locations. If funds allow, it is recommended that when re-mastering is undertaken, two preservation masters are created to allow for geographic separation.

Tape cleaning and re-mastering

Tape cleaning is most often recommended with open reel video formats, due to problems with sticky shed syndrome. Tapes with sticky shed deposit debris on the tape path of playback machines, making transfer difficult to impossible.

Conservation Actions

Methods of open reel tape cleaning have been developed by re-mastering facilities such as Vidipax and the Bay Area Video Coalition. For cassettes, many facilities use RTI (Research Technology International) machines and other tape conditioning units. Tape cleaning machines typically include a combination of polyester pylon rollers, vacuum chambers, and burnishers. The use of cleaning fluids is not recommended.

Re-mastering is a process of making a duplicate of a tape onto a contemporary videotape format. The resulting tape is often referred to as a preservation master. The preservation master is stored in secure, climate-controlled storage and not played except for emergencies. Viewing copies or duplication masters are also usually struck at the time of re-mastering.

Choosing a tape format for re-mastering can be challenging, as there is no tape format that is the agreed-upon best solution. Digital tape, though not free from problems, is here to stay; supplanting analog tape formats in the broadcast and professional production sectors. Factors to consider in choosing a preservation tape format include:

> A large, strong tape stock will allow for the storage of more information; a tape stock must be physically durable. For example, the tape format Digital Betacam is a thicker, bigger, more durable stock than Hi8 or MiniDV.
>
> A tape stock whose related playback machines are professional, durable, and reliable is recommended. The example above is also an illustration of this point.
>
> A tape stock whose related playback machines are the least subject to obsolescence is recommended. Tape formats that have the greatest market penetration in the broadcast and professional production sectors are thought to be less subject to obsolescence.
>
> A tape stock that allows for the greatest amount of information to be maintained is recommended. Digital tape formats involve compression of data. The lowest amount of compression is preferred when re-mastering. For example, D1 is an uncompressed digital video format, and Digital Betacam has a low rate of compression.
>
> An organization's resources and workflow must be considered. Some tape stock – such as D2 – is very expensive. Playback decks for D2 are out of reach for most organizations in the non-profit sector.

At the time of this writing, many people agreed that Digital Betacam, a 1/2" format, is a good choice for a preservation master. It is a digital format with low compression that is thought to have good market penetration. The decks are professional quality and thought to be reliable. Some organizations distrust digital formats or find them too expensive, and choose BetacamSP. Although BetacamSP shares many of the same advantages as Digital Betacam - in terms of reliability, durability, and market share - production of the decks is expected to be discontinued within the next 3 – 5 years.

Following the logic of the factors above, DVD is not considered to be a good media for preservation. Video stored on DVD is likely to be highly compressed and the durability of optical media is unknown at this time.

With all re-mastering projects, quality control must be maintained. Real-time viewing of re-mastered tapes, duplication copies, and screening copies on playback equipment kept in optimal working condition is the best way to ensure quality.

Conservation Actions

Locating a high-quality version

Since videotapes often exist in multiples, the tape your organization owns may not be the highest quality version of the work you are seeking to preserve. It will be important to determine if another organization or individual holds an original, master, or high-quality copy before you begin a preservation project. An analog tape degrades each time a copy is made, and errors may occur on digital tape copies. It is important to re-master from the highest quality tape to ensure a faithful rendering of the original video work.

Preservation planning and budgeting

Ongoing videotape care and preservation requires planning and dedicated line items in your organization's budget. Costs for videotape preservation will vary widely according to the size of your holdings, their condition, and your existing resources, such as storage vaults. Typical budget items will include: shelving, archival cases, labeling supplies, vendor fees for cleaning and re-mastering, and storage fees. Project costs will vary widely, depending on formats, tape condition, and the number of copies requested. Funds may also be needed for professional collection surveys or development of descriptive databases.

Resources for Video Preservation

See also the Sources section, which lists resources consulted when creating this website.

General Video Preservation Resources

The website of the *Association of Moving Image Archivists*, a non-profit professional association that serves the field of moving image archiving, contains extensive information on video preservation issues. Under the heading "AMIA IPublications and Resources" relevant sections include: "Storage Standards and Guidelines for Film and Video" and "Videotape Preservation Fact Sheets." AMIA also holds an annual conference (see below) and has a listserv, AMIA-L, which is an excellent source of information on media preservation. http://www.amianet.org; Email: amia@amianet.com

Basic Inspection Techniques to Sample the Condition of Magnetic Tape is a checklist prepared by the vendor Spec Brothers that is helpful in diagnosing tape problems. http://www.specsbros.com/whitepaper.html

Bay Area Video Coalition (BAVC) is a non-profit media arts center that offers video re-mastering for 3/4" Umatic, 1/2" open reel, and other formats. The "Video Preservation Resources" section of the BAVC website contains a comprehensive glossary of video preservation terms, links to a wide range of organizations active in preservation, sections on cataloging and hardware, and an events archive that charts the history of conferences and panels on independent media arts preservation. In 2003, BAVC produced an interactive DVD,*Playback: Preserving Analog Video*, that contains information on analog videotape composition and deterioration, as well as a case study that follows the preservation of a work of video art. An earlier monograph, *Playback: A Preservation Primer for Video* (BAVC, 1998), is also a very useful resource. The DVD can be ordered from the website at http://www.bavc.org/classes/dvd/preservation.htm; questions about the DVD and monograph can be directed to presdvd@bavc.org.

Conservation OnLine (CoOL) is an on-line text library of conservation resources created by the *American Institute for the Conservation of Historic and Artistic Works (AIC)*. The video preservation section offers information on standards, guidelines and best practices for video preservation, and bibliographic resources (including a large number of articles that exist on-line), among other preservation resources. AIC also operates a listserv that is an excellent source of information on conservation. http://aic.stanford.edu/pubs/porder.html

Independent Media Arts Preservation (IMAP) is a non-profit organization that serves the field of independent media, providing preservation resources, information, and training. IMAP distributes a cataloging template, which is based on national standards, through its website. http://www.imappreserve.org; Email: imap@imappreserve.org.

MIC: Moving Image Collections is a portal to moving image collections for educators, researchers, exhibitors, and the general public. It is also a resource for preservationists seeking to describe and maintain these kinds of collections. Additionally, it serves as a source for controlled vocabulary for moving image cataloging. http://gondolin.rutgers.edu/MIC/

Video Format Identification Guide – Created by Sarah Stauderman, this guide includes a wide range of formats and assigns obsolescence ratings to each one. http://www.paulmessier.com/VideoID/

Resources for Video Preservation

Video Preservation: the Basics – an on-line resource published as part of the *Experimental Television Center's* "Video History Project." This website provides a thorough overview of all aspects of video preservation. Included are preservation terms and definitions, preservation planning and management, handling of tape, storage guidelines, cataloging, cleaning and remastering, disaster planning, and links to additional preservation resources. ETC also published *Reel to Real: A Case Study of BAVC's Remastering Model* by Luke Hones (2002), which details the process of re-mastering 1/2" open reel tapes. http://www.experimentaltvcenter.org/history/preservation/preservation.php3

Magnetic Tape Storage and Handling: A Guide for Libraries and Archives, written by Dr. John W. C. Van Bogart is classic text on magnetic media preservation (The Commission on Preservation and Access, Washington, DC, 1995). http://www.clir.org/pubs/reports/pub54/index.html

Key Organizations

The Association of Moving Image Archivists is a non-profit professional association that serves the field of moving image archiving through information-sharing, local and national initiatives, publications, and professional development. Most of AMIA's work is conducted through Committees (such as Conservation, Cataloging and Documentation, Digital Initiatives) Interest Groups (such as Digital Archives, Independent Media, Small Gauge Film), and Task Forces (such as Diversity, Local Television, Digital Issues). The list of committees and interest groups can be found at http://www.amianet.org/05_Committees/committees.html; Email: amia@amianet.com

The American Institute for Conservation of Historic and Artistic Works (AIC) is a national membership organization of conservation professionals dedicated to preserving art and historic artifacts. AIC devoted Volume 40 No. 3 (2002) of their journal to the issue of installation art preservation. Titled *TechArcheology: Journal of the American Institute for Conservation*, the publication can be ordered online at http://aic.stanford.edu/pubs/porder.html.

The Electronic Media Specialty Group (EMG) is a group within AIC focused on the preservation of electronic art and electronic-based cultural materials. EMG provides a forum for art conservators and related professionals to develop and maintain knowledge of new media and emerging technologies. Meetings of the EMG occur at the annual meetings of AIC. http://aic.stanford.edu/conspec/emg/

Independent Media Arts Preservation (IMAP) is a service, education, and advocacy organization that provides access to information about preservation practices and research. They offer workshops, one-on-one assessments, and technical assistance to the field; promote media preservation activities through publications, forums, and conferences; and distribute a cataloging template (see above). The IMAP website (http://www.imappreserve.org) also contains a full compliment of information resources on all aspects of media preservation. Email: imap@imappreserve.org

Vendors

Bay Area Video Coalition offers preservation services including cleaning and transfer from 1/2" open reel, 3/4" U-Matic, and VHS tapes. Location: San Francisco, CA. Phone: (415) 861-3282; http://www.bavc.org; Email: preservation@bavc.org

DCVideo Post provides transfer services from a wide range of formats including obsolete formats such as 2" quad, 1/2" open reel, and 1/2" Betamax. Located in Burbank, CA. Phone: (818) 563-1073; http://dcvideo.com/INDEX.HTML; Email: david@dcvideo.com

SPECS Brothers, a video and audiotape restoration facility located in Ridgefield Park, New Jersey, offers services in archival restoration, disaster recovery and consulting on archival management, disaster planning, and other areas. The website also contains information on a range of preservation issues including sections on Disaster Recovery and Disaster Planning. Phone: 800.852.7732; http://www.specsbros.com/; Email: admin@specsbrothers.com

Vidipax offers video and audiotape restoration, as well as archival film to tape transfers. Vidipax can restore and transfer a wide range of obsolete formats including 2" Quad, 1", 1/2" Open Reel, Betamax, and 3/4" U-Matic. They also offer disaster recovery, encoding, and a wide range of consulting services. The website also contains extensive resource links, and videotape and audiotape format guides. Their New York City location also houses the Vidipax Museum of Magnetic Recorders. Phone: 800.653.8434; http://www.vidipax.com/; Email: info@vidipax.com

Supplies

Gaylord (aka Gaylord.com) offers archival supplies such as gloves and acid-free labels, as well as a wide range of acid-free containers for videotapes, audiocassettes and reels, film and multimedia. Phone: (800) 448-6160; http://www.gaylord.com/; Email: customerservice@gaylord.com

Image Permanence Institute (IPI) at the Rochester Institute of Technology offers a downloadable preservation calculator for evaluating storage conditions at http://www.rit.edu/~661www1/sub_pages/8page20.htm. Phone: (716) 475-5199

University Products (aka archivalsuppliers.com) offers archival supplies such as gloves and acid-free labels, as well as a wide range of acid-free containers for videotapes, audiocassettes and reels, film and multimedia. Phone: (800) 448-6160; http://www.archivalsuppliers.com; Email: custserv@archivalsuppliers.com

Funding

Funding also may be available from local and statewide arts and historic preservation organizations.

Institute of Museum and Library Services
IMLS is a federal agency supporting U.S. museums and libraries providing funding for conservation projects, conservation assessments, and national leadership projects. http://www.imls.gov/

National Endowment for the Arts
The goals of the NEA Heritage & Preservation are to "assist, preserve, document, and present those artists and forms of artistic expression that reflect our nation's diverse cultural traditions, and to conserve important works of art." http://www.nea.gov/

National Endowment for the Humanities
The NEH Division of Preservation and Access provides grants to preserve and create access to humanities collections and to conduct preservation research and training. http://www.neh.fed.us/

National Historic Publications and Records Commission
NHPRC is part of the National Archives and Records Administration (NARA) and funds nonprofit organizations to preserve "documentary sources significant to the history of the United States." It also funds archival preservation, processing, and the development of archival tools and standards. http://www.archives.gov/grants/index.html

Glossary

Definitions of tape problems – dropout, hydrolysis, sticky shed, and vinegar syndrome – are used with permission from the 1996 glossary "Video Preservation: Glossary of Terms" by Rebecca Bachman (http://palimpsest.stanford.edu/byorg/bavc/bavcterm.html). The glossary is a great resource for other terms you may hear as you become more involved with video preservation.

ANALOG TAPE ➤ Videotape that records a representation of a continuous electronic signal.

ARTIFACTS ➤ The distortion of a digital video image caused by such factors as errors, loss of information, or computer processes during decompression. Common artifacts are blocks of large pixels or the presence of jerky motion in playback.

COMPONENT VIDEO ➤ With component video, the luminance (black and white levels) and chrominance (color information) are transmitted as separate signals. The picture quality is superior to composite video.

COMPOSITE VIDEO ➤ All color, luminance, and synchronizing information is carried together as part of the same signal. Composite video was the norm until the early 1990s.

COMPRESSION ➤ A term for the process of reducing the size of a digital file, to help with storage or transmission, through a codec (a compression/decompression algorithm or formula).

DIGITAL TAPE ➤ Videotape that records a numerical representation of how an electronic signal changes over time. A digital recording is produced from a digital file that may be compressed or decompressed as part of the recording/duplication process.

DROPOUT ➤ Brief signal loss caused by a tape head clog, defect in the tape, debris, or other feature that causes an increase in the head-to-tape spacing. A dropout can also be caused by missing magnetic material. A video dropout generally appears as a white spot or streak on the video monitor. When several video dropouts occur per frame, the TV monitor will appear snowy. The frequent appearance of dropouts on playback is an indication that the tape or recorder is contaminated with debris and/or that the tape binder is deteriorating.

DUPLICATION MASTER (AKA DUBMASTER) ➤ A tape that is used for creating viewing or reference copies. In the case of analog tape, a dubmaster is usually one generation off of an original recording, edit master, or preservation master. In the case of a digital tape, a dubmaster may be, for all practical purposes, a "clone" of the original or master tape.

FORMAT ➤ In video, a term used for the size, packaging, and sometimes the recording standard of a certain family of videotapes. Tapes that are the same format, though different brands or made by different manufacturers, will play back on the same equipment.

GENERATION ➤ a term, typically used with analog recordings, that commonly refers to the relationship between original or master recording and subsequent copies.

HYDROLYSIS ➤ The chemical process in which scission of a chemical bond occurs via reaction with water. The polyester chemical bonds in tape binder polymers are subject to hydrolysis, producing alcohol and acid end groups. Hydrolysis is a reversible reaction, meaning that the alcohol and acid groups can react with each other to produce a polyester bond and water as a by-product. In practice, however, a severely degraded tape binder layer will never fully reconstruct back to its original integrity when placed in a very low-humidity environment.

Glossary

PRESERVATION MASTER ➤ The common term for a tape that is created through the process of re-mastering. Preservation masters are ideally only accessed when a duplication master is no longer useful for making viewing copies.

RE-MASTERING ➤ Copying a tape to a new, contemporary format, following standard television practices to ensure the best possible result. The new tape is commonly called a preservation master.

STICKY SHED ➤ The gummy deposits left on tape path guides and heads after a sticky tape has been played. The phenomenon whereby a tape binder has deteriorated to such a degree that it lacks sufficient cohesive strength so that the magnetic coating sheds on playback. The shedding of particles by the tape as a result of binder deterioration that causes dropouts on [video]tapes.

VINEGAR SYNDROME ➤ Characteristic of the decomposition of acetate-based magnetic tape where acetic acid is a substantial by-product that gives the tape a vinegar-like odor. After the onset of the vinegar syndrome, acetate tape backings degrade at an accelerated rate--the hydrolysis of the acetate is catalyzed further by the presence of acetic acid by-product.

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Disclaimer

The information provided in the *Videotape Identification and Assessment Guide* has been prepared carefully using reputable sources and the advice of respected experts. However, the Guide is for general informational purposes only and should not be treated as a substitute for the advice of a qualified professional. The authors, advisors, and the Texas Commission on the Arts are not liable for the validity of the claims published in this guide and cannot be held responsible for any damage or loss that is incurred as a result of the misuse of the information presented herein.