

**ANATOMY OF THE ANALOG: THE PRESERVATION OF FRANK THEYS'S VIDEO
INSTALLATION *ORATORIUM FOR PREPARED VIDEO PLAYER AND EIGHT
MONITORS* (1989)**

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ABSTRACT

This paper details some of the issues regarding the preservation of *Oratorium for Prepared Video Player and Eight Monitors*, a video installation made in 1989 by the Belgian artist Frank Theys (b. 1963). This artwork was the subject of one of the case studies that was part of *Obsolete Equipment: Preservation of Playback and Display Equipment for Audiovisual Art*, a joint research project of the Netherlands Media Art Institute and PACKED vzw. Following a description of the artwork, its technical components, and their relationship to the integrity and authenticity of the artwork, this text lists the modifications and problems that the installation experienced in the past and those that it might encounter in the future. Finally, it draws the attention to some of the important measures and adjustments that the Museum of Contemporary Art, Antwerp, the owner of the work, has to implement in order to keep the playback and display equipment of the installation functional.

INTRODUCTION

The project *Obsolete Equipment: Preservation of Playback and Display Equipment for Audiovisual Art* (July 1, 2009–June 30, 2011) included eighteen case studies from the art collections of five Belgian and Dutch institutions: the Netherlands Cultural Heritage Agency (ICN), Amersfoort; the Kröller-Müller Museum (KMM), Otterlo; the Museum of Contemporary Art (M HKA), Antwerp; the Netherlands Media Art Institute (NIMk), Amsterdam; the Municipal Museum of Contemporary Art (S.M.A.K.), Ghent; and the Stedelijk Museum, Amsterdam.¹ The first part of the project focused on video installations. Frank Theys's *Oratorium For Prepared Video*

Player and Eight Monitors (1989) was one of the four cases studies initially selected from the M KHA collection (fig. 1). While it was not possible to reinstall all selected works during the course of the project, *Oratorium* was shown twice, in two different venues. The first was at M KHA in a collection presentation, *Collectiepresentatie XXV* (March 19, 2010–April 6, 2010) and the second at the Argos Center For Art And Media in Brussels (November 5, 2010–December 11, 2010) as part of the festival Open Archive II. The two exhibitions provided an opportunity to closely examine the work and to identify issues related to the obsolescence of nearly all its components. This paper focuses solely on the equipment-related problems and the possible conservation measures that can be taken to counteract them. The two main sources for this study are the work on Frank Theys's installation done by PACKED vzw in collaboration with M KHA and the list of guidelines for the preservation of obsolete equipment being developed in collaboration with NIMk.



Fig. 1. Video still captured from Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors*, 1989, Pal U-matic low-band video, dimensions variable, M KHA collection, acc. no. M0031.

DESCRIPTION OF THE WORK

An oratorio is a musical composition employing chorus, orchestra, and soloists, and is usually (but not necessarily) a sacred libretto staged without stage action or scenery. The word oratory is defined as a place of prayer with a small altar. In Frank Theys's installation this small altar takes the shape of a U-matic deck installed on top of a bass guitar amplifier with speakers. Around these

two stacked devices are eight video monitors placed on custom-made iron stands that face each other in a circle. Each monitor displays a black and white close-up of a man singing “You’ll Never Walk Alone,” the famous football anthem of the Liverpool Football Club. The soundtrack is a polyphonic version of the song performed by the male choir of the Catholic University of Leuven, Belgium.

The ¾-inch U-matic videotape, on which the two-minute sequence was recorded twice, has been taken out of its cassette and made into a loop using transparent adhesive tape. Supported by a circle of seven tripods placed inside the bigger circle of monitors, the loop runs out of the player and into a circuit inside the installation. The tripods are music stands whose upper-parts—on which scores are usually set—have been removed. They physically extend the tape path of the player and spread the tape throughout the space.

In *Oratorium*, the transmission of the video signal is unveiled to make its components visible. The deck plays back the U-matic tape and the video and audio signals are sent to the monitor placed in front of the player through two merged cables. This first monitor is then connected to the seven other monitors using the video and audio input and output sockets at the back of the monitors. A different curly audio cable (RCA/Jack 6.35 mm) connects the deck to the front of a Marshall amplifier. The sound is mono, and for the artist the role of the bass amplifier is to reproduce the lower frequencies of the soundtrack, while the built-in speakers of the monitors reproduce the medium and high frequencies (fig. 2)

MEANING OF THE WORK

While the videotape runs in and out of the player, there is a continuous connection between the video image and its carrier, as the images on the monitors seem to cheer on their own carrier, without which they would not ex-

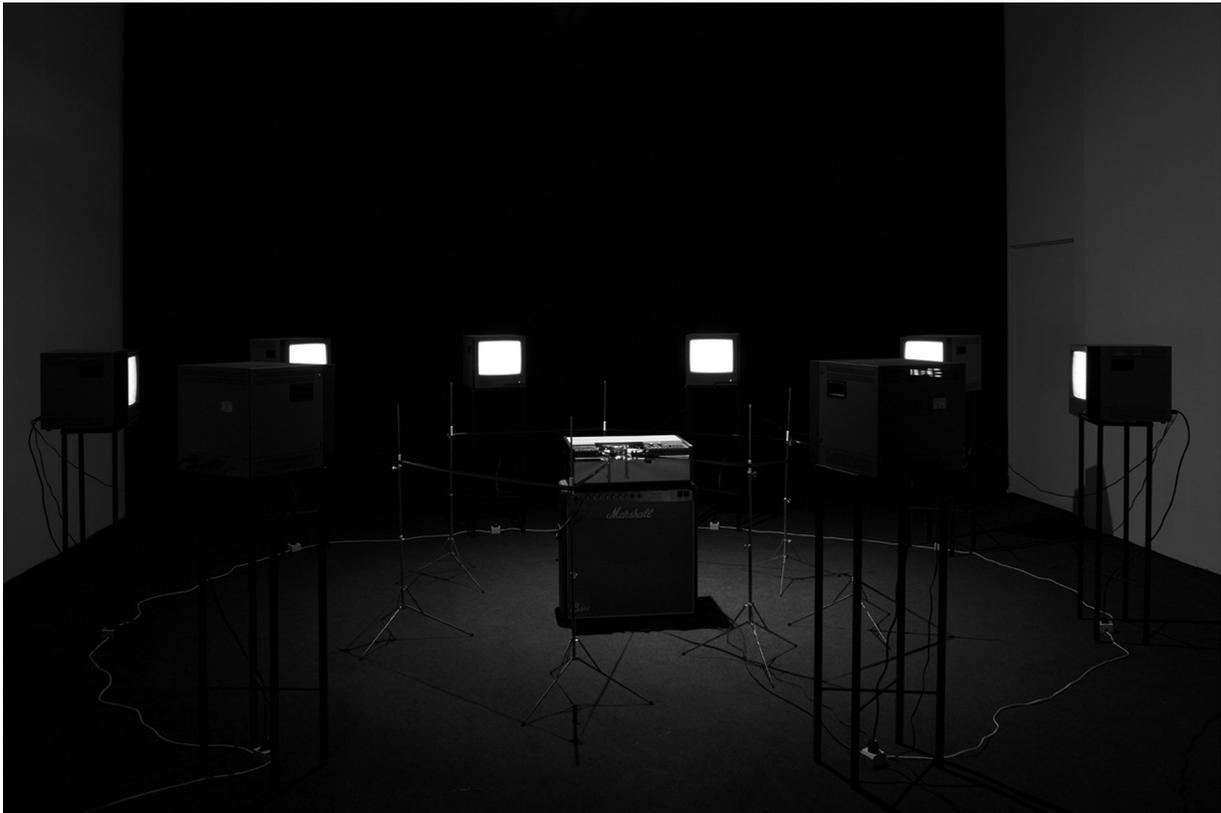


Fig. 2. Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors*. Installation view at the Argos Centre for Art and Media, Brussels, in 2010, Courtesy of Jan Kempnaers.

ist. “The image supports itself and its own support continuously. It is an oratorio that sings the praises of the unbreakable relation between the image and its support and that puts the traditional relation image/support into question” (Monteyne 1995, 58-59).

During a discussion organized as part of the Open Archive II exhibition at Argos, Frank Theys said that when he made the work in 1989, he had imagined *Oratorium* as a kind of Occidental response to Nam June Paik’s *TV Buddha* (a closed circuit installation from 1974, where a statue of Buddha is watching its own image being filmed and displayed in real time on a television set). Indeed there are some formal and conceptual resemblances between the two works, and some sections of the following analysis of *Oratorium* by N. Monteyne could probably also be applied to Paik’s piece:

Another title of this work could have been “emanation.” The emanation or corpuscular theory, that claims that all things, without discontinuity in its evolution, arise from the highest principle, is visualized here in an extreme way. Frank Theys brings a closed circuit wherein the image observes its own intestines/support. A continuous repetition of sound and image, a continuous connection between image and support makes a full circle that excludes all creativity, just like in the corpuscular theory. Is the artist someone who is capable to act creative or does he need to be represented as a godlike figure that observes its own intestines? (Monteyne 1995, 58–59)

To continue the intestines analogy, a second alternative title for the work could be *Anatomy of the Analog*, as the circular configuration and bare machinery of the installation are in some way reminiscent of the anatomical theatres of the seventeenth century. In *Oratorium* the “organs” of the work—the carrier, the equipment, the image, and the sound—are exposed and split up in the space to further reveal their intrinsic relationship.

EXHIBITION HISTORY AND CHANGES

In the exhibition catalog for *Reconstructing Swiss Video Art from 1970s and 1980s*, J. Gfeller writes, “The first valid manifestation of a work of video art, its debut so to speak, probably takes place in the studio or at the first exhibition. Here the work can prove its value for the first time and will probably be optimized for further performances (which might indeed take place in the sphere of exhibitions)” (2009, 168).

Oratorium for Prepared Video Player and Eight Monitors has been shown eleven times and underwent several modifications between 1989 and 2011. The exhibition history includes:

- Beursschouwburg, Brussels, Belgium, 1989
- Tagankatheater, Moscow, Russia, 1990
- Kijkhuis Den Haag, Netherlands, 1990
- *Retrospectieve van Belgische video-installaties*, M HKA, Antwerp, Belgium, June 26–August 8, 1993 (fig. 3)

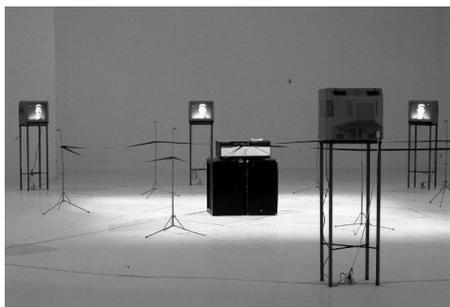


Fig. 3. Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors* shown at M KHA for the exhibition *Retrospectieve van Belgische video-installaties* in 1993. Courtesy of Frank Theys.

- *Gemartelde Tijd : 16 Kunstenaars en de ‘Marteling van de Heilige Erasmus’ van Dirk Bouts*, Transit, Kapel van de Romaanse Poort, Leuven, Belgium, 1995
- *Collectiepresentatie XIX – Een Verhaal van het beeld*, M HKA, Antwerp, Belgium, May 31–August 19, 2007
- *Collectiepresentatie XXV*, M HKA, Antwerp, Belgium, March 19–April 6, 2010
- Open Archive II Festival, Argos Centre for Art and Media, Brussels, Belgium, November 5–December 11, 2010 (fig. 2)

Other un-dated exhibitions include:

- BUDA, Kortrijk
- STUK, Leuven
- Concert Noble, Brussels

As explained by the artist, the first versions of the work used television receivers (the model is undocumented). Because the receivers did not have any video input or output, the U-matic video signal was transmitted as a Radio Frequency (RF) signal with white coaxial cables. The RF signal coming from the deck had to be amplified with small round signal amplifiers. Without amplification the signal was not strong enough to feed the eight television monitors. Later, in another exhibition, other televisions (also undocumented) were used. These units were very sensitive to the unstable tape path, and switched to another channel each time the signal was lost. To be able to use them to show the work, an I.DEN IVT-7 time base corrector (TBC) had to be used in order to stabilize the signal. The TBC was placed between the amplifier and the U-matic deck.

When M KHA acquired the work in 2004, it also bought new television sets (JVC AV 14 BM 8 S). The new sets had a video input and therefore the original coaxial RF connections were replaced with composite video connections. A distribution signal amplifier (KRAMER VM-

10ARII), to which each television was connected, was used instead of the small RF amplifiers. It was placed on the floor behind the bass amplifier. When one of the JVC sets later failed, M HKA replaced all of the television sets in the installation with professional closed-circuit (CCTV) black and white monitors (ABUS Security-Center Profiline TV8121, 4:3, 15 in. monitors) in 2007. These monitors have a slightly bigger screen diagonal (15 in.) than the previous television sets (14 in.) but were chosen by the artist because they could fit on the stands and had a simple and less dated design. The monitors have both a video composite signal input and output, which means RF output and a TBC no longer had to be used for the work.

In the exhibition *Collectiepresentatie XXV* at M KHA (March 19–April 6, 2010), the work was first installed with the TBC and the distribution signal amplifier. After a test and discussions with Frank Theys—who remembered the reason why the TBC was formerly used—it became clear that the work did not need it anymore to get a sufficient, stable video signal, and so the decision was made to remove it. Since the CCTV monitors all have input and output plugs, they can be connected in a series so the distribution signal amplifier was no longer needed. They have an impedance of 75 Ω allowing the signal to be strong enough for the eight monitors. The removal of these two (non-original) pieces of hardware and the many cables running on the floor gave the work a more minimalist appearance once again, which was the artist's original intention.

The way that the video signal is transmitted in the installation, as well as the number and position of the cables are, for Frank Theys, an important aspect of the work as well. The cables should hang one meter from the floor in a semi-circle from one monitor to another, so that this curvy shape works as a kind of visual echo to the tape bending on the tripods. In collaboration with the artist, new cables with specific lengths based on the position of the monitors were ordered during the exhibition at

Argos. The work was then finally installed the way Frank Theys wanted, with a minimum amount of equipment and cables, as a single cable connects the first monitor to the U-matic players and the monitors to each other.

The amplifier was also changed from the original version to the one that is now in the collection of M KHA. The currently used Marshall amplifier was purchased when the museum acquired the work in 2004, following the instructions of Frank Theys. The physical presence of the amplifier and the brand name Marshall are today very visually present in the installation. However, this very recognizable look of the amplifier and its connotations were never really considered an important element for the artist. Before this amplifier was purchased, the work was shown with two black amplified speakers that previously belonged to Frank Theys's father. They could no longer be used as they had suffered from humidity-related damage while the work was stored by the artist.

ACTUAL COMPONENTS OF THE WORK

The U-matic deck

The Sony VP-2030 used in *Oratorium* belongs to one of the first generations of U-matic players manufactured by Sony. VP stands for video player, which indicates that it wasn't a recorder (VTR) but simply a player with no recording heads. The deck's casing is made of wood, metal, and plastic. It has a top-loading system, which constitutes a very important feature of the work. Besides their very different look, later models of U-matic players cannot be modified and used to run the work. Their front-loading systems don't allow the tape to be played without a cassette.

To get the tape out, Frank Theys himself modified the original U-matic player (from the audio-visual service of the Catholic University of Leuven). He cut out a piece on the front of the deck and added a system inside the player made with plastic empty reels of a U-matic cassette and some Meccano pieces (fig. 4). The lift system of the player was also manipulated and neutralized. All

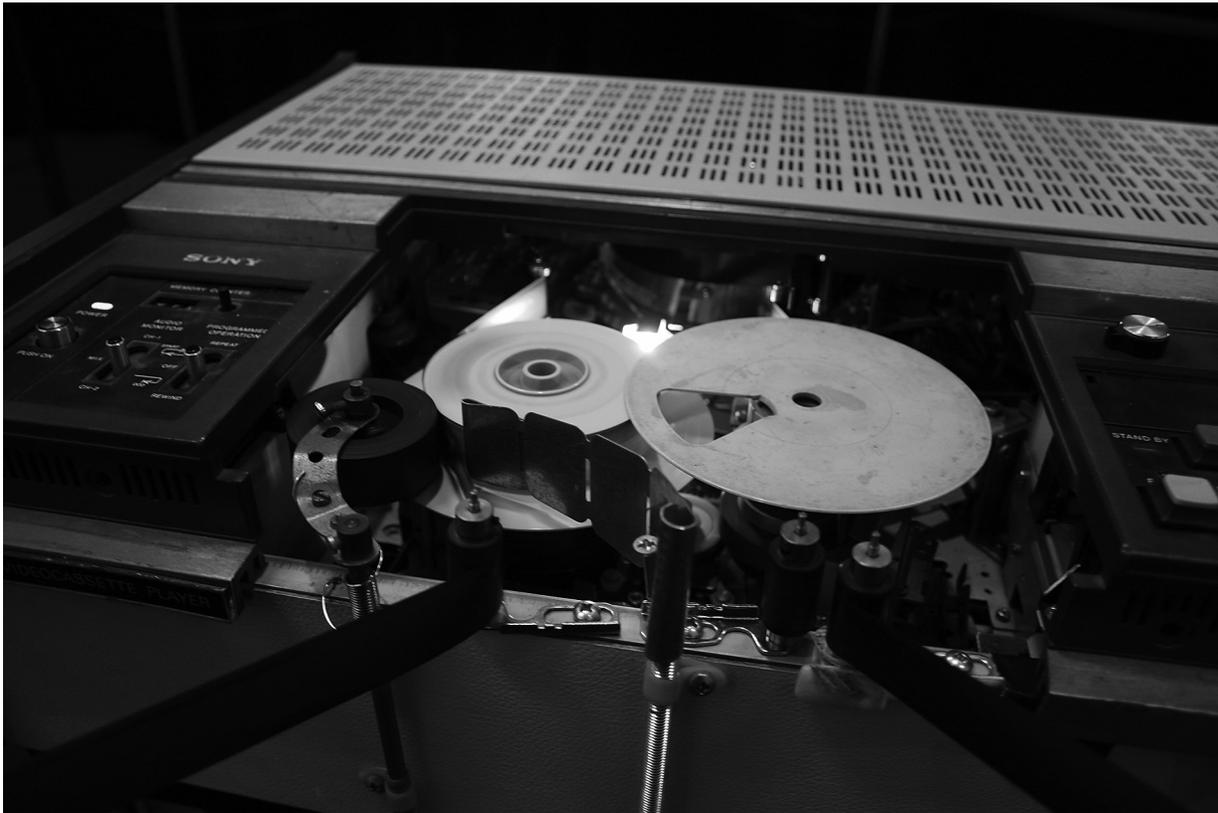


Fig. 4. The modified entry of the U-matic player in Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors*. Courtesy of PACKED vzw.

these adjustments on the player were made with the help of Miel Engelen, the owner (at the time) of 4E Technology in Bierbeek, Belgium.

Monitors

The current Profiline TV8121 monitors are 15 in. black and white monitors designed for video surveillance systems. As described earlier, their technical features—in terms of input and output connections—are important for proper cabling during installation. To keep the work's unity it is also essential that the eight monitors are identical and that they all fit onto the metal stands made specifically for the work by M KHA following the artist's instructions. For Frank Theys, the minimalist sculptural look of the current CCTV monitors and their grey color is what fits well with the work, as they have a standard and simple design compared with the television sets used previously.

Amplifier

The amplifier currently used in the work is a Marshall 4150 Club and Country Bass 100W 4x10 Combo Compressor Bass Amp. There is not a lot of documentation available on the Internet about this amplifier. One reason for this is that it is a very rare model. Prices found on the Web vary between \$500 to \$3,000 USD, which makes it the most expensive piece of equipment in the installation if it had to be bought second-hand today. The amplifier has a dark brown covering and a beige cloth with the Marshall logo on it. The historical reference conveyed by the amplifier—the logo being a defining image of rock music—is very noticeable in the installation.

Cables

The electrical, video, and audio cables restrict the size of the installation and the distance between the elements. First, the length of the multiple socket power cable de-

finishes the perimeter of the monitor circle. The distance between the monitors when they are plugged in to the sockets defines the length of the audio and video cables that connect the monitors in series. The new video and audio cables (video and audio are joined together with BNC and Cinch connectors) were made by the company 4E for the exhibition at Argos in 2010, in accordance with the artist's wish to have cables hanging at one meter from the ground. The cables have different lengths, as the space between each monitor is not completely equal since it is based on the position of the sockets on the power supply cable. For the artist it is important that the visitor has a clear understanding of how the audio and video signal is transmitted in the installation. This is why having one cable instead of several cables coming out of the distribution signal amplifier is a much better option for him (fig. 5).

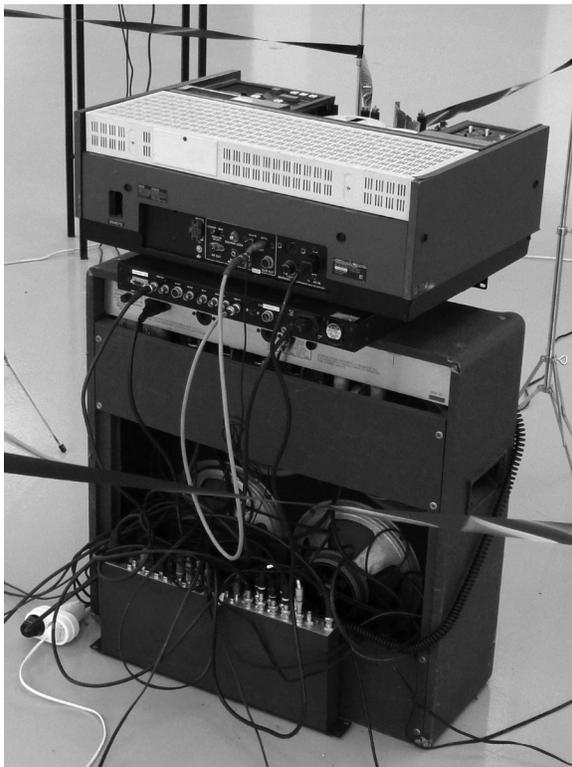


Fig. 5. Installation view of Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors*, when it was still shown with a TBC and a distribution signal amplifier. Courtesy of PACKED vzw.

3/4-in. videotape

The original master tape was shot and edited on a U-matic BVU cassette with the help of the audio-visual service of the Catholic University of Leuven. In 2010 Frank Theys made a digital submaster of the video in DV format and provided a copy for M HKA. This copy is now the duplication master that is used to record a new U-matic copy when needed. Several copies of the two-minute video can be recorded on one U-matic cassette. In order to cut a loop, the beginning and the end of each copy are manually marked on the videotape with respectively one and two white stripes. The tape is then cut at a 45° angle to respect the helical recording method of the U-matic format (fig. 6).

First introduced to the market in 1971 by Sony, the U-matic format is also known as the 3/4-in. format because of the width of the tape. In the 1980s Sony began to market the new Betacam format and, from then on, U-matic became less and less used by the broadcasting sector. New U-matic players and tapes are no longer produced. Stocks of U-matic tapes are still available on the market, and the price per tape is increasing. During the recent exhibitions at M HKA and Argos, the tape loop had to be replaced several times. In order to make new loops in the future, the M HKA would have to create a stock of blank U-matic tapes and to store at least one good U-matic recorder with spare heads.

CONSERVATION ISSUES

Poor documentation

While *Oratorium for Prepared Video Player and Eight Monitors* has been shown and modified several times in the past, no proper documentation was present in M HKA's files. There were only a few photographs of previous exhibitions, and the installations were not always correct in these images, which could have led to severe misunderstandings about how the work should operate and look. Before the Obsolete Equipment project started, these inaccurate installation images were the only visual documentation of the work at M HKA.



Fig. 6. Frank Theys making a loop from the U-matic tape for the exhibition of *Oratorium for Prepared Video Player and Eight Monitors* at M KHA in 2010. Courtesy of PACKED vzw.

The most telling example is an image of a previous exhibition at M KHA where the installation was photographed with only seven monitors, despite the fact that the required number of eight monitors is indicated in the title itself and possesses a symbolic connotation. For the artist, the shape of the number “8” is similar to a loop and to the mathematical representation of infinity (∞), thus referring to the continuous repetition of sound and video images in the installation. This discrepancy in the installation image was probably due to the fact that when it was taken, one of the televisions had already failed during the exhibition and had been removed without being replaced.

This same installation image also showed two television sets displaying a different image. While some monitors showed the singer with his mouth open, one of them

showed him with his mouth closed. They showed a different point in time of the video, while normally the same video signal is displayed on all eight monitors at the same time. After zooming into the image file, it became clear that it had been digitally manipulated to insert video stills inside the frame of the television sets. The reason for this was presumably that the video wasn't visible on the monitors' screens or they may have been off or too bright.

Such inaccurate documentation might mislead future conservators and curators. It could cause confusion about where the second signal came from, or how a delay was introduced between two monitors. The discovery of this issue with the existing documentation was the reason why the work was filmed by the artist and extensively photographed during the exhibition at M KHA in 2010.

Further documentation was also done during the exhibition at Argos in 2010. This included video documentation, guidelines, and plans made in collaboration with the artist. All these new documents were added to the museum's file, and the misleading digitally manipulated image was removed.

Equipment wear and tear

One of the main issues in keeping *Oratorium* working is the wear and tear incurred during operation. The U-matic player (which was not new at the time of the creation of the work) is not made to withstand several weeks or months of operation for eight hours a day, non-stop. While some parts are more sensitive to wear and tear than others, they all suffer from extensive use. The magnetic reading heads wear out quickly and will eventually be unable to play back an adequate signal. Mechanical parts also suffer from erosion. Motors and electronic components of the player will progressively experience problems. As a piece of the deck's cover has been removed to modify the tape path, the inner components are no longer protected from dust and dirt, which can easily gather on the electronic components and mechanics, accelerating deterioration.

The tape further accelerates the deterioration of the player through the loss of particles due to friction between the tape and the iron stands, as well as by gathering dust in the exhibition space. Heads quickly clog and require cleaning during the exhibition. To diminish this process and create a smoother tape path, plastic tubes were placed on the tripods for the exhibition at M KHA. For the exhibition at Argos, Teflon (polytetrafluoroethylene) tubes replaced the plastic ones, as Teflon has a lower coefficient of friction than plastic (fig. 7). This minimal optimization, done with the artist's consent, enables the tape to be less scratchy on the video heads and thus slightly increases their limited lifespan.

The CRT monitor's electron gun and vacuum tubes also have a limited amount of working hours. 30,000 hours

is often defined as the average life expectancy of CRTs, but could be slightly more or less. However, even if a CRT lasts 30,000 hours, the electron gun will stop producing enough electrons to give a satisfying image before reaching that amount of operating hours. The filament of the electron gun may even break and as a consequence render the monitor completely irreparable. The wearing down of the phosphor layer of the tube also eventually makes the monitor unusable. A monitor suffering from burn-in effect (a ghost image retained on the screen), especially with a quiet static image as in *Oratorium*, is also a possible risk.

To extend the monitors' lifespan as long as possible, the museum should always use the lowest contrast and brightness settings acceptable for the work, as high contrasts and brightness wear out a CRT tube more quickly. Since the phosphor layer receives more electrons when these settings are high, it will age faster. This is also true for the electron gun itself, which has to produce more electrons to provide more brightness and contrast. In the past when the tube or the electron gun of a television was worn out, some manufacturers replaced the gun. Currently, this is no longer a possibility apart from using services offered by a couple of small companies that charge a large amount of money to replace the gun without any guarantee of a satisfying result. Moreover, even with the necessary tooling, it is unlikely that a good replacement gun could be found. Another common procedure for "refreshing" a weak CRT monitor consists of using a tube rejuvenator to extend the lifespan of the electron gun. Again, success is not assured, and if successful, the advantages of such an operation would only last for a limited time.

Equipment failures

Just before the opening at M KHA in 2010, the U-matic deck stopped working correctly. The technician, Jan Donvil (4E), came to the museum to identify the origin of the problem. He considered the failure not reparable in time for the opening of the exhibition. Using one of

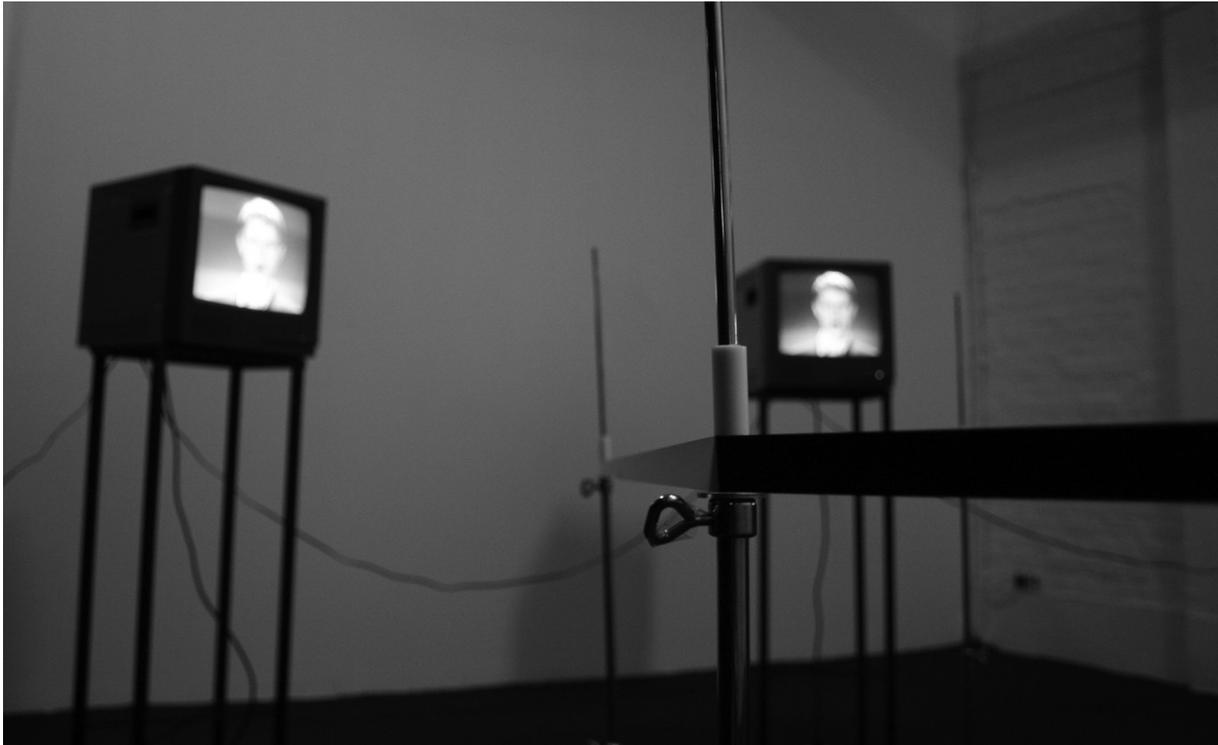


Fig. 7. Teflon tubes placed on the music stands for the exhibition of Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors* at the Argos Centre for Art and Media in 2010. Courtesy of PACKED vzw.

the available spare players of the same model available at M KHA, Jan Donvil made a working unit. As the artist modified the original U-matic player, the replacement procedure involves more than just putting the spare player in place of the other; it requires some modification of the tape path and the casing. The spare player was tested and cleaned by Jan Donvil to serve as back-up player in case of a problem in the future, but was only intended to be used later. Unfortunately a problem came earlier than expected.

A week after the replacement of the player, the heads of the newly converted player smashed and Jan Donvil was called again. He replaced the upper drum of the reserve unit with the one from the original unit. The rebuilt machine appeared much more sensitive to any incorrect tension of the tape than the original one: when the tape wasn't tight enough or too tight, too many disturbances were visible in the image on the monitors. The height and placement of the closest stands to the U-matic

deck's entrance are very important to achieve the right tension. Even if an angle of 45° on both sides should more or less be respected, one always need to move the tripods slightly to find the right tension of the tape when installing the work. This tension cannot really be documented precisely as it is very much intuitive and dependent on the position of all eight stands and on the player's tape path.

Handling of the work

When maintaining, installing, or displaying a work like *Oratorium*, electronic devices can be victim of mishandlings such as being dropped, used with the wrong media, or operated with improper voltage or a bad electrical installation, resulting in power surges inside the device, etc. Poor security in the exhibition venue could increase the risk of a visitor causing the monitor to fall or touching the tape. When on display *Oratorium* should ideally be monitored by a guard to ensure that no one tries to touch the equipment; touching the tape to see if it would alter

the video image could be appealing for a curious and careless visitor. As a result, M KHA's loan contract with Argos stated that the work had to be permanently monitored. Additionally, starting the video player of *Oratorium* to run the videotape loop is in itself a difficult and risky operation since proper tape tension is so crucial. Staff members responsible for operating the equipment must be specifically trained and at least two people should be present to start the installation. It is essential to make sure that the tape does not come off the stands and wrap itself into the U-matic player, where it could easily break a mechanical part or damage the fragile ferrite material of the reading heads.

CONSERVATION STRATEGIES

Some general thoughts

In the interview with Bruce Nauman reproduced by P. Laurenson in her text *Authenticity, Change, and Loss in the Conservation of Time-Based Media Installations*, the artist says about the preservation of his work, *Art Makeup*: "I think it's when you're dealing with having to maintain some technology that pretty much has gone, you have to decide whether that's really part of the piece or if it can be changed" (2006, 10).

When applied to the equipment in Frank Theys's installation, the question of what can be changed and what is really part of the work is already partially answered by the title of the work itself. Even before seeing the work, we are informed that a prepared video player and eight monitors will be part of what we will see and that *Oratorium* was created specifically for these devices. While for many video installations the original playback system of the work (videotape, Laserdisc, etc.) can often be migrated in a satisfying way to a newer technology like DVD players, computers or flash card players, here it is not the case. Strategies such as full or partial migration to new carriers and technologies aren't suited for both the display and the playback equipment of *Oratorium*. The equipment determines its historicity and look, and is fully part of the concept. LCD or Plasma screens can-

not replace the eight cubic CRT monitors. Even leaving aside these aesthetic and ethical concerns, the work would simply no longer work without the original type of equipment.

One exception is the amplifier and the speakers, which were already changed once when the work was acquired. The artist made it clear that if the current model were to fail irreparably (which is unlikely for the moment as all the spare parts, such as lamps, are still easily available), any bass guitar amplifier from the same era with a similar size and tint would be acceptable as a replacement. This is lucky for M KHA as the price for the same amplifier could be higher than the price paid by the museum in 2004 to acquire the work (€2,000 Euro). Although it is replaceable, the rock and roll reference associated with the use of a Marshall amplifier should remain. In combination with the religious connotations of the title of the work, the amplifier accentuates the interesting clash that happens when pop culture, represented by football and rock music, is mixed with the singing choir and altar setting (fig. 8). This aspect seemed important, and when pointed out to the artist, he confirmed that the reference was there from the beginning (in the background) as his father used the original black speakers when he played in a band. He added that a new amplifier should have this familiar look, bringing a very common cultural reference into the work.

Emulation of the work

"To emulate a work is to devise a way of imitating the original look of the piece by completely different means" (Variable Media Network 2012).

At the beginning of the research project, simulating the functionality of the installation and its equipment was considered as a possible way to preserve the artwork. A dummy tape would run in the installation while a digitized version of the video would be displayed from a hidden player. Later, when discussing this with the artist, it

became clear that this wasn't an acceptable solution; hiding from the audience how the video image appears would go against the original intent of the work, which was precisely to reveal its own mechanisms. The visual connection between the video image and its carrier, as well as the various video dropouts and tracking problems generated by the unstable tape path, would be lost. The variable vacillation of the image due to the unsteady transmission of the video signal is an integral part of the work, and plays an even more important role today—in our binary world—in its “magic.” Furthermore, when attempts to digitize sequences of the video loop were made at Argos, the capture software wasn't able to catch all the different video artifacts visible on the screen. The monitors themselves produce “glitches” when they in some way interpret a signal loss. It seemed just as if the work itself refused to be digitally captured, reaffirming its analog nature that is only visible if a U-matic player

and CRT monitors are brought together. This is one of the reasons why keeping the obsolete display and playback equipment of the installation in working condition is essential.

Collecting equipment

As all equipment used in *Oratorium* will eventually fail and at some point fall beyond repair, it will have to be replaced by other units. It is already impossible to get any of the elements new from the manufacturers. This makes the purchase of all units available from the second hand market and “new old stocks” (unused but dated equipment that is out of production) an urgent task.

Concerning broadcasting equipment like professional monitors and U-matic players, the Obsolete Equipment project has shown us that sometimes instead of only relying on solutions like eBay (which can be an excellent way



Fig. 8. Detail of the Marshall amplifier in Frank Theys, *Oratorium for Prepared Video Player and Eight Monitors* during the exhibition *Collectiepresentatie XXV* at M KHA, in 2010. Courtesy of PACKED vzw.

to find equipment) to find the right devices, it might be more fruitful to search for local pools of equipment like television stations, universities, and archives that are renovating their audio-visual infrastructure. During the research project, several opportunities to obtain spare U-matic players originated from these types of institutions. Apart from being often cheaper, unless it has been extensively used equipment coming from professional studios is often in better shape. This is due to regular maintenance by in-house technicians.

While two spare U-matic players (top loaders) were already stored at M KHA, there are only eight monitors of the current type. This means that there are no spare monitors if one failed. The production of the Abus Profiline TV8121, as almost any other type of CRT monitor, has been discontinued. It is extremely difficult to find the same exact model, even on the second hand market. For M HKA, a better approach would be to buy more widely sold and known brands of professional monitors like JVC or SONY as replacement models. First of all, a device used in several different areas (broadcast stations, hospitals, etc.), is much more likely to pop up from a new old stock or the second hand market. Second, buying popular brands also makes it easier to find spare parts and technical resources on the devices (e.g. forum threads about a recurrent failure). Of course the museum should at the same time buy as many similar spare monitors as possible, in order to avoid being in the same situation as with the previous JVC televisions if one of the monitors broke.

As already mentioned all components of the equipment suffer from overuse and could fail, but some key spare parts known to be very fragile should be collected in priority. For this purpose, as part of the Obsolete Equipment research project, Paul Klomp created a Proposal for Component Level Risk Analysis. In *Oratorium* the reading heads of the U-matic deck have proved to be one of the most likely parts to experience problems. For the other parts the question is trickier as all equipment has

its own particular weaknesses due to different design or component manufacturers. The flyback transformers (generating high-voltage in the CRT) and the cathode ray tubes themselves are the most problematic parts if they fail. Instead of collecting spare parts for monitors and even for the video deck, it is recommended to collect the complete units. Buying spare cathode ray tubes and spare flyback transformers might in the end be more expensive and more risky than collecting the entire device, as one wouldn't be able to control the quality of the individual components. Defective equipment should also be kept, as it can be cannibalized for spare parts to repair other equipment (as with the video deck at M KHA).

Storage and maintenance

“The importance of collecting and storing equipment has been underestimated for far too long. Although storing is the usual museum conservation approach, it has never been common practice to collect all the related equipment for media artworks. Frequently, all the equipment required for an installation is no longer available and/or the equipment pool is used to display a number of artworks.” (Wijers 2010)

Indeed, collecting and storing electronic devices is quite new for museums that are used to keeping traditional artifacts for which preservation guidelines have been developed throughout the years. However, the storage requirements for equipment are not more demanding than for other types of objects and materials. Most of the threats to equipment originate from the same source: storage conditions (humidity, temperature, dust), environmental factors like sunlight (yellowing and bleaching of casing colors) or oxygen (degradation of rubber belts), aging (specifically the loss of the components), and natural phenomena like corrosion or oxidation. If the equipment is not stored properly, it is often because the collecting institution fails to consider it to be an integral component of the work.

When the original U-matic player of *Oratorium* came out of storage for the exhibition at M KHA, it was obvious that the storage conditions had been poor. A lot of dust had entered the deck and most likely caused the first failure before the opening at M KHA. As it enters the equipment, dust has several adverse effects. It accumulates in the mechanics of the deck and on the reading heads, making it harder for them to operate. Dust is in general bad for all parts of any electronic device. It increases internal heat and prevents the proper discharge of hot air, which is essential for the longevity of components. Dust also gathers humidity that can create conductive areas and electrostatic discharges within the equipment. Other examples of negative effects due to dust exist for each type of appliance.

All the equipment for *Oratorium* and its spares should be stored on proper shelves with good climate conditions. They should be protected from dust and other external risks. This can be done by putting them in boxes or sealed bags. After the exhibition period they should be cleaned and maintained in order to store them in the best possible condition. Better storage conditions and care minimizes the need for the intervention of a technician. Bringing in a technician each time the U-matic deck failed represented a significant cost for M KHA, especially as intervention was urgent because the exhibition opening was imminent. Of course, even with perfect storage conditions, some components of the equipment will get old, unstable and create failures (e.g. a leaking capacitor or battery). However, proper storage and maintenance will help postpone such failures.

Turning on the equipment

While periods of non-use increase the lifetime for some parts of the equipment (e.g., reading heads or CRTs), some failures can also originate from a long period of storage and non-operation. While there are few available statistics and research on dormancy-related failures for electronic appliances, some information was collected

during the Obsolete Equipment project from the respective experience of electronic repair technicians and engineers. Based on interviews with them, it became clear that because of the properties of certain components, regularly turning on the equipment in cases of long-term storage could be a beneficial procedure. This action could permit electronic components with a high failure rate like capacitors to retain their specifications longer, and thus avoid the need for repair. Mechanical parts like rollers and rubber belts in the U-matic deck could also benefit from such action, as it would enable them to keep their shape and mobility.

However, there isn't any scientific background for such a maintenance routine, nor do exact numbers exist on how regularly and how long the equipment should be turned on. The information extracted from the interviews with technicians and engineers indicates a range from once every month for the duration of an hour to once a year for half a day. This kind of calculation is a trade off between the maximum operating hours of a device and the failures due to a too long period of inactivity. If a collecting institution like M KHA implemented such a routine for its pool of equipment, the resources in terms of time or staff would probably be the most deciding factor. Turning on the equipment on a regular basis could also be a way for M KHA to survey its collection and detect a faulty device that would need maintenance, repair, or replacement in time. The main argument against such a procedure is the fact that supplementary handling increases the risks of mishandling.

In his *System Reliability Toolkit: A Practical Guide for Understanding and Implementing a Reliability Program*, D. Nicholls makes a case against the procedure of turning devices on regularly when storing electronic equipment: "It is recommended that components and systems in storage should not be periodically tested. Historical data shows that failures are introduced as a result of the testing process. Causes of many of the failures were test procedures, test equipment, and operator errors" (1999,



Fig. 9. A defective capacitor in the power supply unit of a computer. Courtesy of PACKED vzw.

301). Although Nicholls's point is understandable, in the context of artworks using dedicated obsolete equipment, being able to identify a faulty device quickly might be the best chance for finding a solution before it's too late, be it repair or finding a replacement unit. Regular checks may also prevent further deterioration of the equipment. If, for instance, a defective capacitor causing an image failure is detected at an early stage (fig. 9), it could be removed before it has the opportunity to eventually leak inside the equipment and cause other problems or permanent damage to neighboring components. This would make the repair more difficult or even impossible.

Collecting technical documentation

Collecting technical documentation is closely linked to the maintenance and storage of an artwork using electronic equipment. This is why complete documentation of the work should also include the user and ser-

vice manuals for every device that is part of *Oratorium*. Whether they are kept with the rest of the documentation or in a separate technical library, the museum should collect manuals as they contain both useful and critical information (such as the ideal relative humidity and temperature for storage, adjustment instructions, parts references, schematics, etc.). Service manuals are needed for maintaining and troubleshooting a piece of equipment. When equipment needs to be repaired, having the technical documentation available could save working time for the technician and therefore lower repair costs. If the technician has to search for a manual him or herself, track down a portion of circuit by hand or look for the reference of a part, the final cost will probably be much higher.

The good news is that the Web has made it easier to find technical documentation and information for a wide

range of obsolete devices. When the manufacturers no longer provide documentation, there are still many ways to get hold of it: eBay, free online repositories of manuals, or resellers of digitized copies. For old and rare equipment like the U-matic player, collector websites such as *LabGuy's World* for video devices, and other resources such as enthusiast forums and discussion boards like the *Old VTR's Group*, can be useful in finding missing documentation. These communities exist for almost any kind of equipment. For instance schematics for the Marshall amplifier were found during research as freely downloadable from the Amp Archives website at www.amparchives.com (Cook 2012).

But even with the Web, finding documentation for equipment sold by small brands, like the Abus Profileline monitors of *Oratorium*, remains a problem. While the user manual for the monitors was downloadable from the company's website, the rest of the documentation couldn't be found on the Internet. Even the manufacturer couldn't provide it anymore. The only people who have access to these documents are part of the manufacturer's service department that no longer provides any maintenance once the warranty period has come to an end. As previously mentioned, this constitutes another argument for prioritizing widely sold brands and models.

BUILDING A NETWORK OF SKILLED TECHNICIANS AND SECURING THEIR KNOWLEDGE

Once the collecting institution has the necessary documentation, it needs employees with the specific knowledge to eventually use it. Obsolescence does not only make it hard to find spare equipment and parts, it also makes it more difficult to find people with the right skills to service and maintain analog equipment. These people retire and the new generations of electronic engineers do not always learn how to deal with component-based electronics. Until now each time that *Oratorium* has had problems, the company 4E was able to execute the necessary maintenance and repair. As Miel Engelen (the former director of 4E) is the one who assisted Frank Theys

in 1989 to originally modify the U-matic deck, 4E is a very good solution and partner. Miel Engelen has already retired and luckily Jan Donvil, the services after sales engineer, has taken over the maintenance of *Oratorium* whenever there's a problem with the work. However, there is a good chance that one day nobody at 4E will be able to help the M HKA anymore. To be prepared for this, the museum has to search for other alternative options, and needs to bring as much knowledge on how the work operates in-house to ensure that the knowledge (and the work) won't become lost (fig. 10).

CONSERVATION BUDGET FOR EQUIPMENT

Preserving *Oratorium* for the long-term will require investments in spare equipment. While finding obsolete equipment in proper condition is already a big challenge due to time, a limited conservation budget can be another major obstacle. When spares are not bought during the acquisition process of the work, the only possibility for a conservation department to buy new equipment is often when the work has to be exhibited. Then the exhibition budget can be used to collect spare devices to make sure that the installation will withstand the entire duration of the show. This economic reality makes it hard to act quickly. Unfortunately, the longer one waits, the scarcer the equipment gets, the more expensive it becomes, and the worse the condition it is in when it is available.

Oratorium has had an active exhibition life since 2010, and will likely be shown next year in China at the Caffa Art Museum in Beijing. It would be the right occasion for the conservator and the museum to make the necessary investment in equipment, not only to be able to show the work this time, but also for future exhibitions.

CONCLUSION

The "continuous connection between image and support" and the inherent analog quality of *Oratorium* inhibits any attempt to migrate or modernize its components, making the storage of spare equipment and tapes the only pos-



Fig. 10. Frank Theys and a technician checking the inside of the player during installation of *Oratorium for Prepared Video Player and Eight Monitors* at M KHA in 2010. Courtesy of PACKED vzw.

sible strategy to achieve satisfactory long-term preservation (Monteyne 1995, 58–59).

Including the case study of *Oratorium* in the Obsolete Equipment project provided the opportunity to create a list of the main problems that M KHA will face in order to continue to exhibit this work. It also made it possible to map the steps necessary to anticipate preservation issues. Interviews with the artist provided major input in terms of what the essential aspects of the artwork are and how important the equipment is in retaining them. The exhibitions at M KHA and Argos made it possible to document exactly how the work has to be installed. Here again, the presence of Frank Theys during the installation process was extremely valuable. Such research

presents an opportunity to investigate the different aspects of a work more broadly, and provides an enormous benefit for the museum, its future viewers, and above all, the artwork itself.

Once the most suitable preservation strategy has been determined for a work, it is the duty of the museum to implement it as quickly as possible. Of course, with a work like *Oratorium*, budget limitations don't always permit this, but making sure that the storage conditions for the equipment are sufficient, and that the maintenance and installation of the work are handled with care are not necessarily costly actions for a museum. However, some preventive measures require the regular survey of critical devices and available resources in terms of technical

services and stocks of spare equipment. They represent a continuous effort, but are important in reducing the risk of future expenses related to repair or research of equipment. Above all, these preventive measures slow-down progress toward the fateful moment when equipment will no longer be available and the work can only be partly experienced, solely remaining in some form of documentation.

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NOTES

- 1 The case studies, together with articles, guidelines, and other resources collected during the project will all be published and accessible through the website of the project available at www.obsolete-equipment.org.

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