

The Preservation Considerations of Historic Electronic Instruments

Abstract & Introduction

After the Second World War, electronic music served as an international unifying agent within both artistic and scientific disciplines. By the dawn of the 1950s, many composers and engineers had become intrigued by the possibilities of combining new technology with musical expression. By the early 1960s, electronic music studios were common on university campuses. The unique electronic instruments from this early era are increasingly finding their way into archives and museums (see Cuervo, 2011; Davies, 2001; Ramel, 2004).

If these instruments are to remain playable, they will require ongoing specialized servicing. Pease (1991) states that although there are many factors that affect the lifespan of electronic components, it is generally accepted that the most vulnerable electronic components will start to fail after twenty years with greater failure rates occurring in more types of components as more time passes. Although there are several steps that can be implemented to prolong the life of electronic components, such as environmental control and providing regulated power to the circuits, considerations must be made for when components do fail.

The purpose of this study is to understand what sort of methodologies exist for the preservation of historic electronic musical instruments in archives and special collections and what sort of considerations are still needed. Although there has been an influx of electronic music instruments making their way into museums and archives, little has been done to create a unified methodology regarding potential preservation strategies for these instruments. A

preservation strategy, simply put is meant to describe the plan of how an archive will maintain an electronic instrument once it is received (see American Alliance of Museums, 2016).

For this paper, I will utilize a case study of two existing preservation strategies for two separate electronic musical instruments. I will then examine different considerations that should potentially be included in a preservation strategy.



Contrasting Preservation Strategies

As noted, within the last decade, many notable electronic instruments have made their way into archives and museums. At the University of Illinois at Urbana-Champaign (UIUC), the Sousa Archives and Center for American Music (Sousa Archives) has received James Beauchamp’s “Harmonic Tone Generator” (HTG) and Salvatore Martirano’s “Sal-Mar Construction” electronic instruments. Salvatore Martirano’s Sal-Mar Construction was a groundbreaking analog/digital programmable musical instrument that was built in several stages starting in 1968 (Cuervo, 2011; p. 38). James Beauchamp’s HTG was built in 1964 and was

developed as a collaboration between the UIUC Schools of Engineering and Music (Beauchamp, 1965, p. iii).

Although both of the Sal-Mar Construction and the HTG are in the same archive, the preservation of these instruments stands in contrast. The Sal-Mar Construction entered the Sousa Archive in good condition and remains playable even to this day. The HTG entered the archive in a state of disrepair and remains in such a state. Although the Sal-Mar Construction was only built five or so years after the HTG, it used fairly modern, and still commercially available, electronic components. The HTG, on the other hand, utilized long obsolete and rare components (most notably a component called an audio transformer). When the problem of obsolete parts is combined with much of the circuitry of the HTG being badly damaged or missing it is easy to understand why the machine sits behind glass, nonfunctional. In a lecture given by James Beauchamp (2015) at the Sousa Archive, Beauchamp expressed resignation in having the HTG permanently in a state of disrepair.

The Sal-Mar Construction, on the other hand, was donated to the Sousa Archive in excellent condition and it was the demand of the Martirano estate that the machine be kept functional for future compositions and performances (Cuervo, 2011, p. 34). Fortunately, the preservation of the Sal-Mar Construction is aided by having a local electronics technician who is very familiar with the machine.

Although the HTG is non-functional, Mark Smart of the UIUC School of Engineering built a digital "HTG2" which has the same look and essential functionality of the original HTG (Valentine, 2015). In regards to the HTG2, Scott Schwartz (2016) states

There will be times when proposed conservation work needed to keep an instrument functional will significantly alter the original state of the instrument, and when this is the case we then choose to leave the instrument in its non-functional state. The original

Harmonic Tone Generator could not be made to function using its original boards and set up, so we decided to recreate a new HTG (our HTG2) using more modern technologies to provide visitors an opportunity to understand the basic functionalities of the original HTG using the HTG2, and we've left the original HTG in its non-functional state.

Although this recreation of the HTG2 is not a tit-for-tat copy of the original, such near-exact recreations do exist of other historic electronic instruments (see EMS, 2016; Ebolatone, 2016; MOS-Lab, 2016). Hobbyists and technicians are proving that they can replicate an electronic instrument down to the component level to make a newer creation look and sound practically identical to the original. This idea of the replication of electronic instruments holds many unexplored possibilities not only for the preservation of electronic instruments but also the accessibility of such instruments. Such a development should not be overlooked when evaluating a preservation strategy for electronic instruments.



James Beauchamp and the original Harmonic Tone Generator



James Beauchamp and Mark Smart with the replicated Harmonic Tone Generator at the Sousa Archives and Center for American Music on the UIUC campus.

Both of these photos were taken from:
<https://www.ece.illinois.edu/newsroom/article/11857>

Why Musical Electronic Musical Instrument Preservation is Unique

Although there is a rich tradition of preserving traditional musical instruments, the preservation of electronic musical instruments is unique because in many musical compositions, it is impossible to separate the electronic instrument from the created output (Cuervo 2011, pp. 43-44). Cuervo (2011), a former Sousa Archives employee, argues that

In the case of the Sal-Mar Construction, both the sounds and the musical instrument are highly valuable as artifacts and sonic documents of a not so distant past when music and technology were first coexisting as a viable research and aesthetic endeavor. Preserving the artifact that materializes computer technology and music composition is a priority for us, as well as keeping it functional for research and performance. We think of music as a document that can be accessed only via the musical instrument, with a recording becoming its surrogate. (p.44)

Such a statement is made with the understanding that the Sal-Mar Construction was able to output four audio channels to twenty-four different strategically placed speakers with corresponding lighting (Cuervo, 2011, p. 34). Such a presentation not easily replicable without the actual instrument.

Preservation Considerations

Davies (2001) argues that electronics proficiency is a frequently overlooked, but important skill within the preservation field. It should therefore be a consideration of any receiving institution as to their own ability to service an incoming electronic musical instrument. Furthermore, Davies (2011) states that documentation is the key to the survival of electronic instruments (such documentation can include electronic schematics, photos, and component parts lists). Pennycock (2008) reasons that it is the responsibility of the instrument's creator to provide such documentation to an archive upon the instrument's donation. Therefore, the preservation of

electronic instruments needs to be a collaborative effort between the instrument's designer and the receiving archive.

Such findings are supported by the example of the Sal-Mar Construction which is kept alive by thorough documentation and a local technician. Being that the HTG utilizes extremely rare components and is badly damaged, it is reasonable to add the availability to find original components to the list of factors that will keep historic electronic instruments functioning in the future. The need to replace any components with other date specific components is essential to the preservation plan of the Sousa Archive and is part of a larger preservation paradigm. Scott Schwartz (2016) states

Since the Sal-Mar is a museum object and the Sousa Archives follows the preservation guidelines of the American Alliance of Museums, our general practice for any conservation work done to our instrument collections is to use the techniques and materials that were used to construct the original instrument

When such changes are made on the Sal-Mar Construction, they are documented and the replaced component is retained (Schwartz, 2016). Such a strategy ensures that changes are reversible, time specific, and that provenance is not lost.

Unfortunately, very little specific information has been published regarding uniform preservation considerations of historic electronic musical instruments. Part of the problem may be that these instruments can be vastly different in design and functionality. Preservation strategies for historical electronic instruments hold a myriad of possible areas for consideration, as has been demonstrated at the Sousa Archive. A good electronic instrument preservation strategy should define the overall goal for the instrument within the archive, the desired accessibility and functionality of the instrument, how the instrument will be stored, how the

instrument will be serviced, and how to document such servicing. Such a plan should also recognize standards in the preservation field.

Without such a clear preservation strategy, an archive risks permanently damaging an electronic instrument, making irreversible changes and modifications to the electronic instrument, altering the provenance of an instrument, and miscalculating cost and time consideration regarding the preservation of such instruments.

Conclusion

Because so little has been written on this subject, a unified methodology regarding the preservation of historic electronic musical instruments is lacking. Although most archives, special collections, and museums follow a similar set of standards when it comes to the preservation of cultural artifacts, more research needs to be done on how these instruments are preserved and documented. That said, it is the creator of that instrument's responsibility, if they wish to keep the instrument working after they pass on ownership, to provide the necessary documentation needed for the long term survival of the instrument.

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