

# **Digitally Displayed Music Scores**

An Interactive Qualifying Project Report

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By

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## **Abstract**

The process of projecting choral scores, for reading sessions at conventions for the Eastern Division of the American Choral Directors Association (EACDA), was researched. This study leads to further research of portable digital devices, which could display music scores. These researches are based on surveys and studies completed by WPI students at previous conventions and interviews with the current President of EACDA. The final product was a 20 minute presentation for the EACDA 2012 Convention Board presenting the findings from the research and demonstrating adequate techniques for choral score projections at reading sessions during the convention.

## **Acknowledgements**

I would like to give special thanks to the following individuals and groups for helping to complete the project:

John F. Delorey, Director of Choral Music, WPI;

Robert Eaton, President of American Choral Directors Associations Eastern Division;

Rebecca Gaddis, Junior Student, WPI

All staff of Academic Technology Center, WPI

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## Introduction

With its first recorded appearance in 120 BCE in ancient China, choral music has a long and extensive history that has impacted human lives in various aspects. (Hays) From as early as 2,000 BCE, hand-written music has always been an important part of choruses. (Hamlett) However, as the information age of the 21<sup>st</sup> century, has arrived processing documents electronically has become a critical element of daily life. Therefore, the current form of presenting choral music must be modernized to better suit this era.

With millions of copies of “After The Ball” by Tin Pan Alley being sold since the 1890s and millions of songs having been produced, the amount of paper used in the music industry was incredible. (Davidson) During this period, when music was limited to just paper, it also limited the amount of music one individual could acquire. On the other hand, with technological advances music has become more eco-friendly and more available to the masses. In addition, projecting music scores is much more cost effective especially for large groups instead of printing sheet music. Music score projection, along with digital choral folders, is just a few of the technological advances that could create change within the music industry, furthering progress in the presentation of music.

This project is developed upon several projects of similar topics from previous years. It focused on how to use current technologies, primarily projection and portable digital devices, to improve presentation of music in choral reading sessions. Topics such as copyright issues due to electronically distribute music and prices of USB drives were also researched upon due to their direct impact within the music industry. A proposal for the use of music score projection in the EASDA conference in February 2012 was made in the form of, a PowerPoint presentation,

including a short demonstration of music score projection, to the Officers of the East Division of American Choral Directors Association (EACDA) on August 14, 2010 in Providence, Rhode Island.

## Background

### Projection Technology

Music score projection is fairly simple: It consists of connecting a projector to the computer on which the music has been stored, and projecting the output of the computer to a screen. However, due to various specifications and configurations, the quality of the projection may vary on a large scale. Therefore, it is important to understand the meaning of these parameters.

There are two types of projectors in the market: Liquid Crystal Display (LCD) projectors and Digital Light Processing (DLP) projectors. LCDs have the advantage of better color saturation and higher quality images as well as being more power efficient. They also typically have a longer lamp life than DLPs. However, DLP projectors are more compact, therefore more portable. They also produce higher contrast videos. (Powell) Since music score projection largely involves presenting images, LCD projectors meet the specific need requirements better than DLPs do.

Brightness is an important specification of projectors as well. It is measured is American's National Standards Institute (ANSI) lumens, which is a unit for light flux. Projectors of 1000 - 2000 lumens output enough light for normal business offices and classrooms. Projectors of 2000 – 3000 lumens could illuminate images without washouts in large lecture halls. Choosing the projector with the right brightness could help the quality and clarity of the projection greatly.

Contrast ratio is another important specification that should be taken into consideration when choosing a projector as well. It is a measurement of the ratio between the brightest and

darkest areas in an image that the projector displays. Even if a projector has great lumen ratings, without a good contrast ratio, the image appears washed out. (Silva, R.) Projectors with a contrast ratio over 400:1 can display images clearly in most display situations. (Ward)

Resolution is one of the better-known specifications of projectors. It measures the maximum number of pixels, which are the small colored points that make up the image, a projector could display. In other words, the higher the resolution, the clearer the image. However, projectors with very high resolutions are generally much more expensive. Therefore for many companies it is important to find a balance between price and resolution. A projector with a resolution of 1024 x 468 can display high resolution images from videos, detailed documents, and graphics, so a resolution greater than or equal to that is sufficient for general usage. (Bambooav)

Aspect ratio is one of least important parameters but may still be a factor for consideration. It gives the width-to-height ratio of the displayed image. There are some projectors that support multiple aspect ratios, but as with the greater resolution they are generally more expensive. The most common aspect ratios are 16:9 and 4:3. An aspect ratio of 16:9 provides good range for wide screen images from movies, broadcasts, or HDTV videos, while a 4:3 aspect ratio is sufficient for the standard images and videos. (Ward) Depending upon the purposes, projectors with different aspect ratios should be chosen accordingly.

Certain small factors such as compatibility and lamp life may be considered as well for they can be as important as the previously mentioned parameters. The projector requires certain connections to different computers depending upon the computer type. In many cases the plugs might vary and adaptors may be necessary. Sometimes the projector needs to be connected to



televisions, cameras, DVD players, etc. It would be beneficial to choose a projector that contains multiple channels for such connections. The lamp life, or the average time the lamp may last before burning out, should be taken into consideration due to the high cost involved in changing the bulbs. Since changing lamps costs hundreds of dollars, a projector with a long lamp life is more economical and cost effective. Generally, a lamp life of 2,000 hours is considered excellent. However working under eco mode could potentially increase the lamp life. (Ward)

### **Music Score Distribution**

Due to the nature of the project and the desire to propose using music score projection in their upcoming regional conference of EACDA in February 2012, it has to be ensured that attendees have access to the music outside of the chorus gatherings. Therefore, it is important to find an alternative way to distribute music electronically as well.

Universal Serial Bus (USB) drives have become the alternative this project has focused on because of their unique ability to meet all necessary requirements. They are small, compact, and have relatively large capacities for files. They are also highly compatible to various types of computers, systems, and even other types of digital devices such as music players, cell phones, etc. In addition, most computers could automatically recognize them without installation. They can be read and written on very quickly compared to other devices such as optical disks. Most USB drives have protective caps covering the connectors decreasing the chances of damage.. (Paul) Therefore, USB drives are user friendly, which limits the possibilities of technical difficulties and are the most convenient alternative under current technology.

Four companies were contacted in order to obtain quotes for USB drives. They were USBsmg, CFgear, FlashCoast, and RELYmedia. For comparison, a quote for 1500, 1GB, USB

drives were requested from each company. USBsmg gave a price of \$5.39 for each USB drive, with about 40MB of data preloaded on each at no additional charge. CFgear was a little more expensive, at \$5.65 per USB drive with only 30MB of free data preloaded. FlashCoast provided the most economical price at \$4.99 per USB drive, but they did not specify the amount of data that could be preloaded. RELYmedia's price was \$5.05, with 100MB of free data preloaded. It was concluded that the low cost of USB drives becomes another advantage this form of data storage has. It also indicates that USB drives could become a great alternative for distributing music scores digitally.

The capacity of the USB drives was also researched. The average size of one page of music scores in PDF format was determined to help estimate the amount of music that could be stored onto a USB drive. This, however, will be discussed further and in greater detail in the Methodology section of this report.

### **Copyright Concerns**

Digitally distributing music has a higher chance of causing copyright issues. However, there are certain ways to resolve this problem. First, most of the choral music at Choral Public Domain Library (CPDL) is associated with a standard CPDL copyright license. These pieces of music can be used and distributed freely. (CPDL) Second, according to Buckley and Piper's Interactive Qualifying Project (IQP) in 2007, it is possible to request paper copies of music from publishers, and make digital copies of them to present to a chorus as long as the copyright notice is stated on the electronic copy. However this type of digital music may not be distributed to the chorus. (Buckley) There are certain publishers such as GIA Publications that are willing to provide digital copies of music under certain conditions, one being the score provided has to be

incomplete, or the digital copy has to be unprintable, which can be done by changing the file settings as long as the music is in PDF format. Therefore, copyright issues could be worked out in a certain extent.

### **PDF Readers**

It is also important to evaluate whether it would be beneficial to present music on portable electronic readers, i.e. iPad, Kindle, Barnes & Noble Nook, Sony's Digital Reader, etc. An iPad was used in this project to as test sample. Several PDF reader iPad applications were researched and examined.

There are programs in an iPad that open PDF files depending on where origin of the file. If the PDF file is sent as an attachment to an email, the application Mail would open it. If the PDF file is on a website, Safari would open it. However, iPad does not have a built-in program to specifically read PDF files. When there are PDF files to be read, it is necessary to use certain PDF reader applications. (Agarwal)

GoodReader is one of the most popular document processor applications for iPad. One of the great advantages is its ability to process various types of files, such as Microsoft Word documents, web pages, audio files, and video files. It also has the ability to connect to online accounts like Google docs to download PDF files directly to the iPad. The price is very economical as it is a single payment of only 99 cents. The only shortcoming of GoodReader is that the page turning is a little slower than desired, especially when the page being loaded contains graphics. (Agarwal)

PDF Reader by Kdan Mobile Software also works really well and it has the same low price as GoodReader. One special feature is a built-in web browser that can download PDF files

online. Therefore it is very convenient for people who use online accounts for data storage. One of its disadvantages is not having a search feature. However, this does not concern musicians as much as since the main concern is presenting the music. (Fink)

Another application available to read PDF files is called Cloud Readers. It is a free application and has very user friendly with simple interfaces. However, it can only support PDF files, unlike some of the other applications available but this is efficient for music reading. It renders documents with high speeds, and has a special feature to show two pages of a PDF file side by side on one screen making it ever more beneficial to musicians. (Agarwal)

Stanza is a great PDF reader as well. It was developed by Amazon, who also developed the e-book reader, Kindle. It renders pages very fast, much like the Cloud Readers. The best thing about this application is its feature that organizes all the PDF files on the iPad. The files can be put into categories, which can be named by the users. Each category has a cover image so it is easily distinguishable. This is a great feature to have, especially if there are a large number of pieces on the iPad. (Agarwal)

Generally, there are numerous choices of PDF readers, which allow an iPad to read music scores in PDF format. There are also many different digital readers available, the iPad being only one example. In addition, Worcester Polytechnic Institute (WPI) has a group of students that are actively researching and striving to create a digital choral folder. This would be an electronic device designed to specifically read music in PDF format. It could be a potential alternative to sheet music as well. At the current rate that technology is advancing soon new innovative changes will allow the music industry to advance the presentation styles of music.

## Methodology

### Organization and Planning

To execute the presentation and the music reading session for the Officers of EACDA, the following pieces of equipment were reserved from the Academic Technology Center (ATC).

- 2 NEC VT770 Projectors
- 2 6' Tripod Screens
- 1 Laptop
- 2 25' VGA Cables
- 2 AC Extension Cords with Outlet Taps
- 1 AC Outlet Strip

The NEC VT770 projectors are LCD projectors that have 3,000 ANSI lumens, 1024 x 768 native resolution, 4:3 default aspect ratio (adjustable) and 400:1 contrast ratio. As stated in the background section of this report, these specifications are sufficient to serve the purpose—a PowerPoint presentation and a music reading session. There was a specific need for two separate projectors and screens to allow all singers in the chorus to see the conductor while reading the music. (Buckley) By having two sets of projectors and screens, the conductor could stand in between the two screens allowing both the music and the conductor to be seen.

The PDF version of the music score for the reading session, the score of Mozart's "Ave Verum Corpus", was obtained from the Choral Public Domain Library. Its license was specifically checked to ensure not copyright laws were violated. This music score was incorporated into the PowerPoint presentation as the music reading session was conducted in the

presentation. A black arrow is added at the end of each page to indicate when the page would be turned, since the singers are not in control of turning pages. A recording of the piece performed by the Choir of the Great Commission Church International in Hacienda Heights, California was played along so that people could sing along. Since this project was designed for education purposes, this piece of music was clear from any copyright issues.

In order to ensure all the pieces of equipment work well, a practice presentation and music reading session was conducted in Janet Earle Room on August 13<sup>th</sup>, 2010.

### **Creating A Survey**

To make the proposal to EACDA more complete, a brief sample survey was designed to be given out in the February 2012 conference in order to get feedback on the music projection. This survey was developed upon the surveys and questionnaires in the student IQP reports on music score projection in previous years. Most of the questions emerged from concerns individuals expressed in previous years. The first two questions asked focused on the physical presentation of the music score, such as the clarity of the projection, or whether the singer could see the conductor clearly. The next four questions focused on people's comfort level with the projection, such as whether the singer could follow the music without a hardcopy. The last question asked about the overall experience the singer had in the music reading session. A comment box was also available for the singers to give individual comments on the aspects that might not be covered in the questions of the survey. This survey was presented to the Officers of EACDA as part of the presentation. A complete copy of the survey can be found in Appendix A.

### **Calculating Sizes of PDF Music Scores**

The average size of one page of music scores in PDF format was obtained by recording over the PDF music scores in the Choral Public Domain Library and taking the average of them. The average size of one page of music scores in PDF format was approximately 26KB. Therefore, a 1GB USB drive can hold about 40,000 pages of music. However, it should be noted that depending on how the PDF music score was created, the size of a single page may vary. For example, if the music score is scanned into the computer, it tends to occupy more space on the disk. However, if certain music writing software creates it, the amount of space used is very small compared to scanning. Also, depending on which software is used to create the piece of music, the size of the music score could differ as well. Even with these potential errors in the estimate, the amount of music a 1GB USB drive can hold to is still tremendous. This confirms that USB drives are a good method for distributing music scores digitally.

### **Conducting the Music Reading Session**

One of the most important steps of this project was to set up the equipment for the presentation and music reading session. The assembly of the equipment is simple and straightforward; the most important aspect is ensuring the settings are correct. For example, the brightness and contrast of the two projectors should be the same ensuring both projected images appear the same. The distance between the projectors and the screens must be adjusted to project the images at the desired size. Also, since most of the computers only have one output channel for projectors, displaying the image from the computer onto both projectors becomes a concern. In this case, the computer was connected to one projector as the image input source. This projector was then connected to the other projector as the image input source of the other projector. Therefore, both projectors displayed the image from the computer even though the

computer only contained one output channel. I was in charge of turning pages of the music score during the real music reading session to ensure that the singers are reading the right music.



## **Conclusion & Recommendations**

The presentation for the Officers of EACDA went very well, and they were considerably interested in the proposal. There is a large possibility that they will implement music score projection in their regional conference in February 2012, which could be a great step in innovating the music industry.

According to previous projects and the music reading session conducted in this project, it can be concluded that the technology for music score projection is perfected increasingly as time passes by. With the necessary pieces of equipment, it is definitely a viable option for displaying music in the future and should be encouraged due to all the benefits it brings.

The research by WPI students on digital choral folders has been making considerable progress as well. Two Major Qualifying Projects, one in 2008 and one in 2009, have been done in order to design the digital choral folder, and a digital demonstration of the digital choral folder has been developed. The future of this technology promises great potential.

## **Appendix A – The Survey**

A copy of the survey designed for EACDA's conference in February 2012 is attached on the next page.



## Projected Choral Music Survey

Please circle the number that best describes your experience with the projected scores.

	Strongly Agree	Agree	Average	Disagree	Strongly Disagree
The projection was clear.	5	4	3	2	1
I can see the conductor clearly while reading the projected music.	5	4	3	2	1
I can follow the music well without a hardcopy.	5	4	3	2	1
The view of the screen was comfortable.	5	4	3	2	1
It was easy to follow the projected music with someone else turning the pages.	5	4	3	2	1
Having a sheet to write comments on during the reading is very helpful.	5	4	3	2	1
Overall, I had a good experience with projected music.	5	4	3	2	1

Please leave your comments, concerns, and suggestions for projected music:

Disclaimer: The data collected in this survey will be used for research only and will not be publicly distributed.

## **Appendix B – The Music Score of “Ave Verum Corpus”**

A copy of the music score of “Ave Verum Corpus” used in the music reading session is attached on the following pages.

# Motette "AVE VERUM CORPUS"

(Kochel No. 618)

W. A. Mozart  
(1750 - 1791)

*Adagio*

C Soprano *sotto voce*  
 O Alto *sotto voce*  
 R Tenore *sotto voce*  
 O Basso *sotto voce*

Violino I *sotto voce*  
 Violino II *sotto voce*  
 Viola *sotto voce*  
 Contrabasso e Organo *sotto voce*

A - ve, a - ve ve - rum cor - pus,  
 A - ve, a - ve ve - rum cor - pus,  
 A - ve, a - ve ve - rum cor - pus,  
 A - ve, a - ve ve - rum cor - pus,

5 6 6 9 8  
 3 - 5 4# 4# 5 - 4 3 -  
 2 - -

S  
 A  
 T  
 B

na - tum de Ma - ri - a vir - gi ne, ve - re pas - sum  
 na - tum de Ma - ri - a vir - gi ne, ve - re pas - sum  
 na - tum de Ma - ri - a vir - gi ne, ve - re pas - sum  
 na - tum de Ma - ri - a vir - gi ne, ve - re pas - sum

VI. I  
 VI. II  
 Vla.  
 Cb. e Org.

6 9 6 5 6 4  
 5 - 4 - 3 -

13

S  
im - mo la - tum in cru - ce pro ho - mi - ne.

A  
im - mo la - tum in cru - ce pro ho - mi - ne.

T  
im - mo la - tum in cru - ce pro ho - mi - ne.

B  
im - mo la - tum in cru - ce pro ho - mi - ne.

VI. I

VI. II

Vla.

Cb. e Org. *tasto solo*

6 7 - 6 9 8 6 7 5 -  
5 f - 6 - 6 8 4 f

19

S  
Cu - jus la - tus per - fo -

A  
Cu - jus la - tus per - fo -

T  
Cu - jus la - tus per - fo -

B  
Cu - jus la - tus per - fo -

VI. I

VI. II

Vla.

Cb. e Org.

5 - - 6 - 7<sup>b</sup> 9 8<sup>b</sup> 7<sup>b</sup>  
3 - - 4 - 5 7<sup>b</sup> 6 5  
3 - - 3<sup>b</sup> - - 3 - - -

25

S ra - tum un - da flu - xit et san - gui ne,

A ra - tum un - da flu - xit et san - gui ne,

T ra - tum un - da flu - xit et san - gui ne,

B ra - tum un - da flu - xit et san - gui ne,

VI. I

VI. II

Vla.

Cb. e Org.

- 5<sup>b</sup> - 6 4<sup>+</sup> 2 - 6<sup>b</sup> 3<sup>+</sup> 6 7 6 4 - 6<sup>b</sup> 7<sup>+</sup> 3 4 4 -

- - - - -

- 2 - - - - -

- - - - -

- - - - -

- - - - -

- - - - -

30

S es - to no - bis prae - gus - ta - tum in mor -

A es - to no - bis prae - gus - ta - tum in mor -

T es - to no - bis prae - gus - ta - tum in

B es - to no - bis prae - gus - ta - tum in

VI. I

VI. II

Vla.

Cb. e Org.

7 6 7 6 7

5

35

S tis ex - a mi ne, in mor - -

A tis ex - a mi ne, in mor -

T mor - tis ex - a - mi - ne, in mor -

B mor - tis ex - a - mi - ne, in mor -

VI. I

VI. II

Vla.

Cb. e Org.

6 6 6 6 5 6 6 6 6 6 6

4 4 5 4 3 - 3 4 4 4 5

41

S tis ex - a mi ne.

A tis ex - a mi ne.

T tis ex - a mi ne.

B tis ex - a mi ne.

VI. I

VI. II

Vla.

Cb. e Org.

4 6 6 6 7 6 6 5 -

2 4 4 3 6 7 4 5 4 3

tr



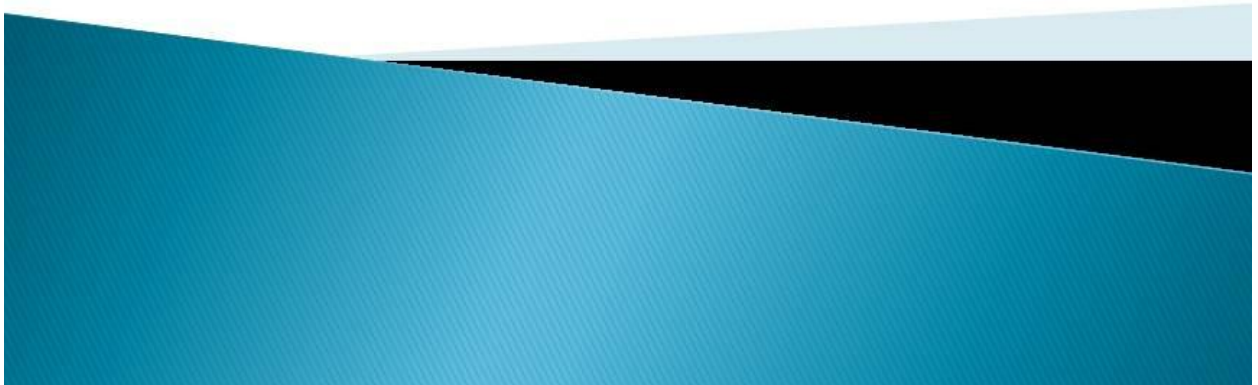
## **Appendix C – The PowerPoint Presentation**

The final PowerPoint presentation of this project is attached on the following pages.



# Digital Score Projection for EACDA Conference February 2012

Xiaojing (Cathy) Wang, WPI, '13  
Math and Physics  
Professor John F. Delorey, WPI, Advisor



# Why project scores?

- ▶ Eco-Friendly
  - The US uses 25% of the world's paper products.
- ▶ Cost effective for conference
- ▶ Time/Labor effective for conference
- ▶ Appropriate for large groups
  - Potential for lowered costs
  - Relatively simple preparation

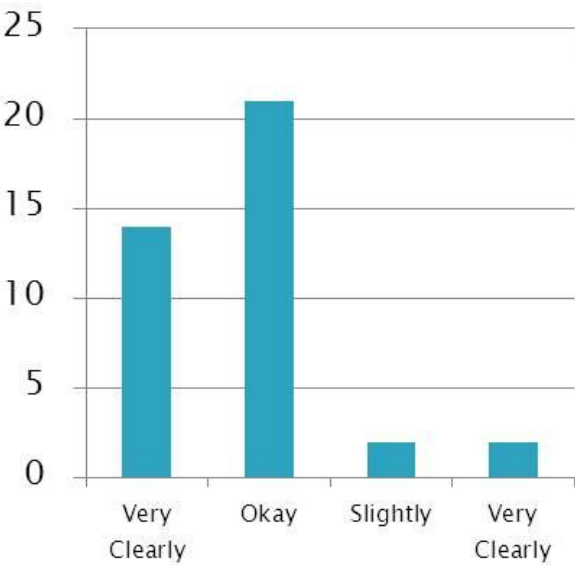


# History

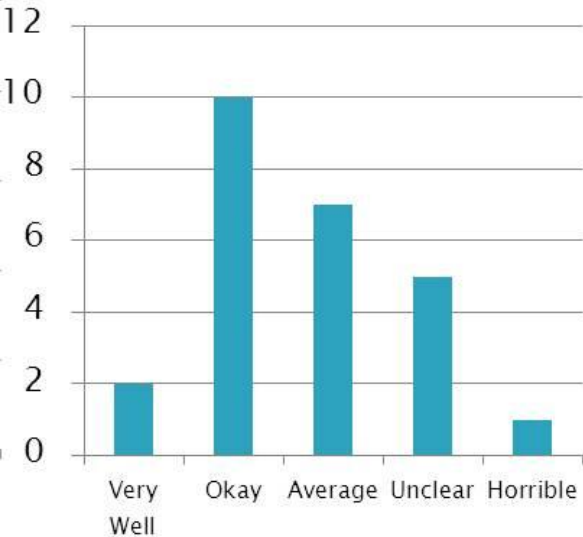
- ▶ ACDA Reading Session 2005 WPI
  - Projected eight scores at four session
- ▶ ACDA Reading Session 2006 Hartford
  - Projected six scores (six hard copies)
- ▶ ACDA Reading Session 2007
  - Projected six scores(two hard copies)
- ▶ ACDA Reading Session 2009
  - Improvements based on the 2007 survey

# Survey Results – Need for Clarity

2007 Q1: Were you able to see the music well?

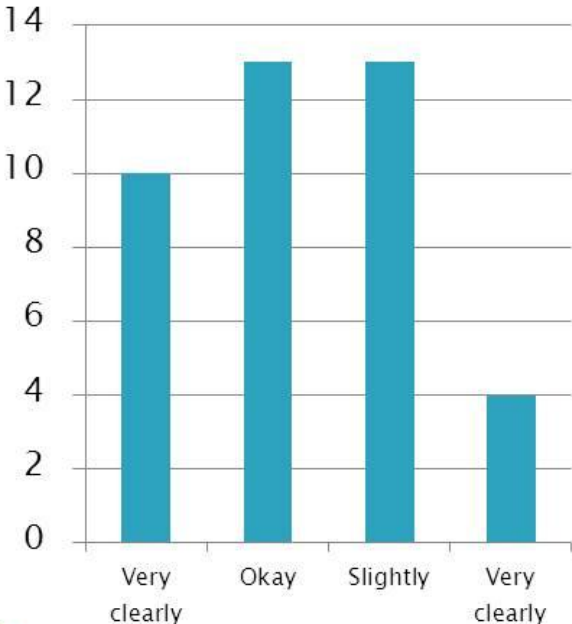


2009 Q5: How well could you see the PDF images?

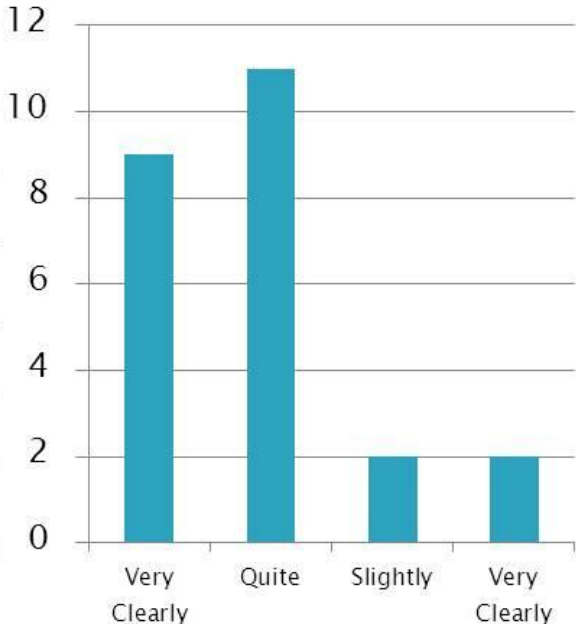


# Survey Results – Need for Two Screens

2007 Q2: Were you able to see the conductor well?



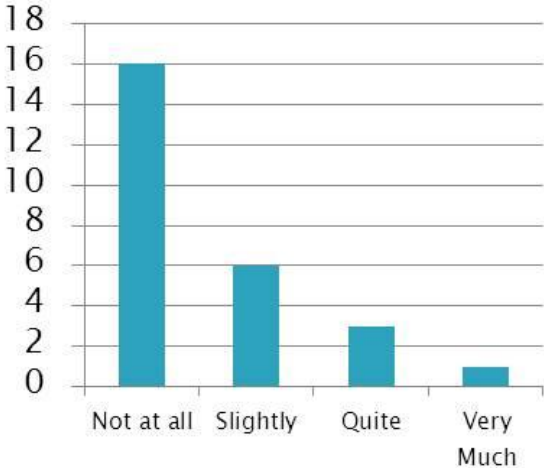
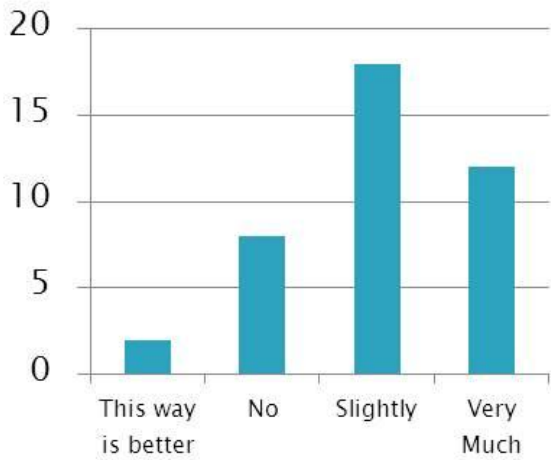
2009 Q10: Were you able to see the conductor well?



# Survey Results – Need to Show Page Turning Point

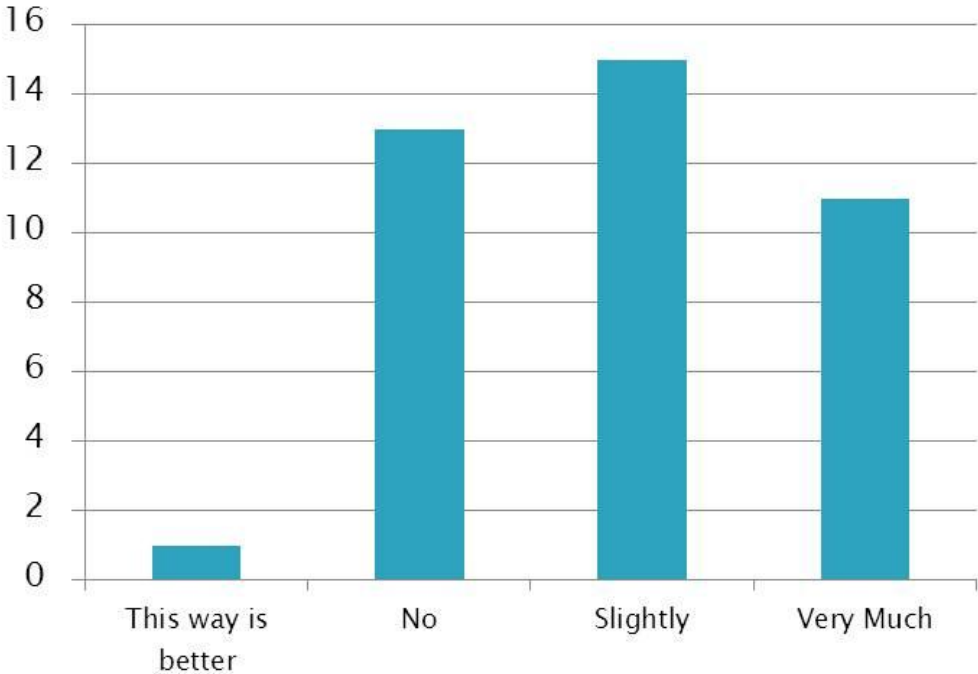
2007 Q3: Was the inability to turn the page yourself frustrating?

2009 Q8: Did the turning of the pages bother you?



# Survey Results – Need for Score Card

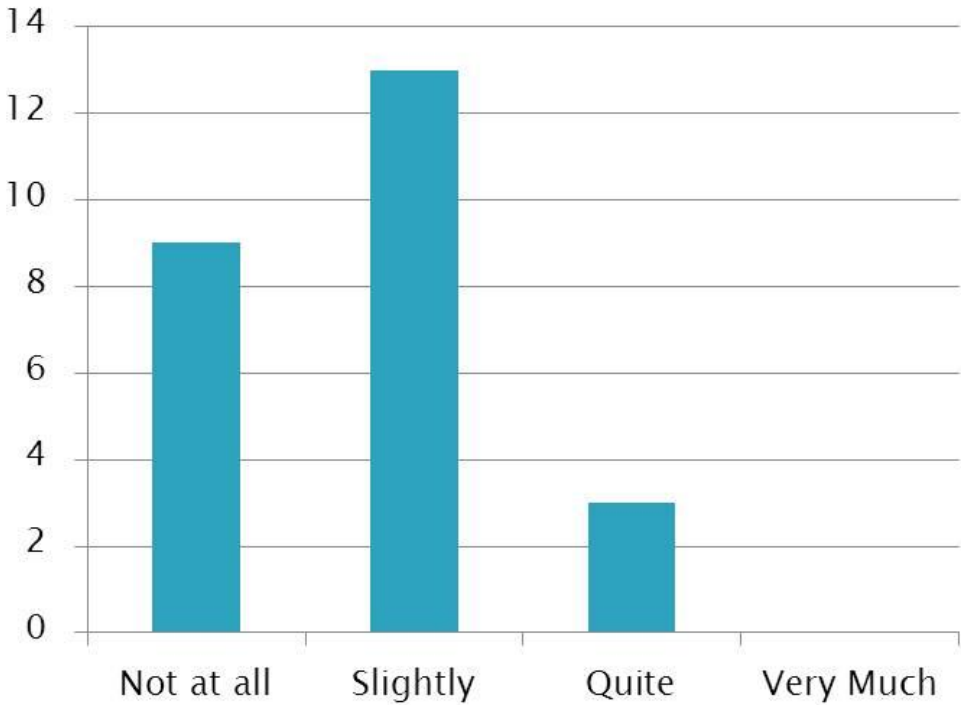
2007 Q5: Was it annoying to write on a separate piece of paper as opposed to right on the music?





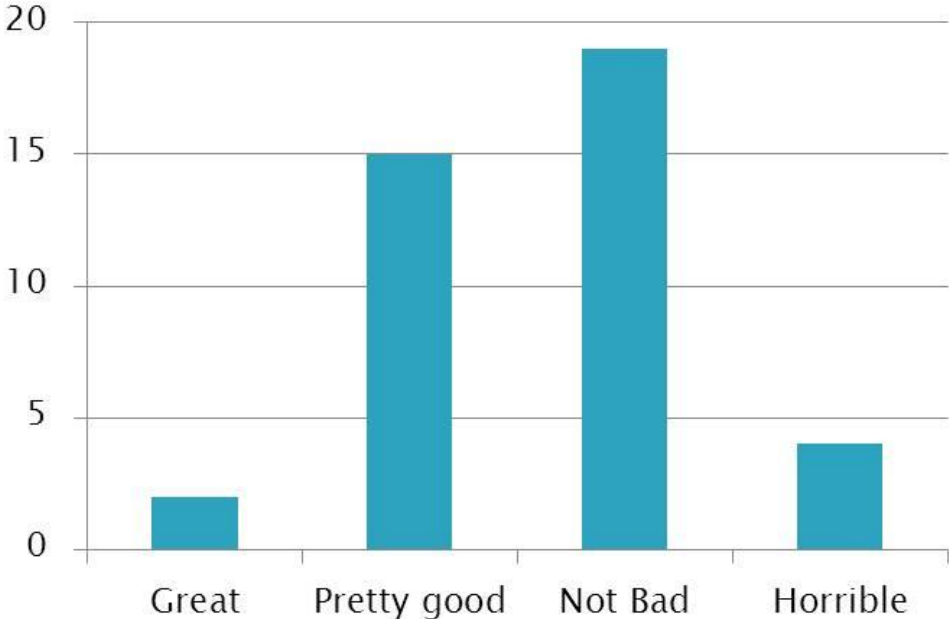
# Survey Results – Ease in Reading Projected Music Scores

2009 Q3: Was is difficult to follow the music w/o hard copy?



# Survey Results – General Acceptance

2007 Q6: How do you think, overall,  
this method of executing a reading  
session is?



# Technical Requirements

- ▶ Projector
  - Resolution, luminosity
- ▶ Projector screen
  - Size, Aspect ratio
- ▶ Computer
  - Software requirements, Compatible output
- ▶ Effective light control



# Methodology

- ▶ Obtain PDF music source
  - Optimize formatting for projection
  - Add page turning marks
- ▶ Obtain the equipment needed
  - Two projectors and two screens
- ▶ Set up equipment at the projection site
  - Verify sight lines
  - Two people to man the projections
    - Page turner
    - Tech assistant





**Projected Choral Music Survey**

Please circle the number that best describes your experience with the projected scores.

	Strongly Agree	Agree	Average	Disagree	Strongly Disagree
The projection was clear.	5	4	3	2	1
I can see the conductor clearly while reading the projected music.	5	4	3	2	1
I can follow the music well without a hardcopy.	5	4	3	2	1
The view of the screen was comfortable.	5	4	3	2	1
It was easy to follow the projected music with someone else turning the pages.	5	4	3	2	1
Having a sheet to write comments on during the reading is very helpful.	5	4	3	2	1
Overall, I had a good experience with projected music.	5	4	3	2	1
Please leave your comments, concerns, and suggestions for projected music:					

Disclaimer: The data collected in this survey will be used for research only and will not be publicly distributed.

35

S tis ex - a - mi - ne, in mor -

A tis ex - a - mi - ne, in mor

T mor - tis ex - a - mi - ne, in mor

B mor - tis ex - a - mi - ne, in mor

VI. I

VI. II

Vla.

Cb. e Org.

6 6 6 6 5 6 6 6 6 6 6 6 6

4 4 5 4 3 - 3 4 4 4 5



41

S tis ex - a - mi - ne.

A tis ex - a - mi - ne.

T tis ex - a - mi - ne.

B tis ex - a - mi - ne.

VI. I

VI. II

Vla.

Cb. e Org.

4 6 6 6 7 6 7 6 6 5 3

2 4 4 3 4 3 5 4 3

## Concerns – Copyright

- ▶ Complex responses from publishers
- ▶ Need for security
  - Incomplete scores
  - Secure PDF files
    - Non-printable

## Suggestion – USB Key Duplication

- ▶ 1GB holds 40,000 standard pages of images
- ▶ Quote for 1500 1GB USB keys
  - usbsmg.com: \$8085, 30–40MB
  - cfgear.com: \$8475, 30MB
  - flashcoast.com: \$7485
  - relymedia.com: \$7575, 100MB



# Suggestion – WPI and Score Projection

- ▶ Research
  - Four students for research 2010 – 2011
  - Eight students for research and deployment for 2011 – 2012 (including Conference)
  
- ▶ Formatting
  - Scanning (where necessary) and preparation of all score for projections (including addition of page turning marks)
  
- ▶ Equipment
  - Eight projectors
  - Eight Projectors
  - Four Laptops



# Future Suggestion

- ▶ Digital Choral Folder?
  - A device displays digital copies of music scores (mostly in PDF format)
- ▶ Benefits
  - Readable under dim lights
  - Portable
  - Long Battery Life
  - Inexpensive
  - Not currently tied to any publisher or distributor



Digital Choral Folder.swf

# Acknowledgements

- ▶ Professor John D. Delorey, WPI, Director of Choral Music
- ▶ Dr. Robert Eaton, President of ACDA Eastern Division
- ▶ Academic Technology Center staff, WPI



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## Appendix D – USB Drive Supplier Companies

### Contact Information

#### USBSMG

Website: [www.usbsmg.com](http://www.usbsmg.com)

Contact Person: Kenneth Salk

Email: [ken@salkmg.com](mailto:ken@salkmg.com)

Phone Number: 954-968-1234

#### CFgear

Website: [www.cfgear.com](http://www.cfgear.com)

Contact Person: Aaron Morford

Email: [aaron@cfgear.com](mailto:aaron@cfgear.com)

Phone Number: 800-371-1984 ext. 7987

#### FlashCoast

Website: [www.flashcoast.com](http://www.flashcoast.com)

Contact Person: Anthony Pfeiffer

Email: [anthony@flashcoast.com](mailto:anthony@flashcoast.com)

Phone Number: 877-203-2043

RELYmedia

Website: [www.relymedia.com](http://www.relymedia.com)

Contact Person: Ryan Petersen & Adam Miller

Email: [ryan\\_petersen@relymedia.com](mailto:ryan_petersen@relymedia.com) & [adam\\_miller@relymedia.com](mailto:adam_miller@relymedia.com)

Phone Number: 952-314-4596

## Email Conversations

USBSMG

### RE: USB flash drive pricing...

发件人: **ken** <ken@salkmg.com> [查看](#) [拒收](#)

时 间: 2010 年 7 月 30 日(星期五) 上午 6:37

收件人:

'w10939210' <w10939210@sogou.com>

Hi Xiaojing:

File loading cost would depend on size of the file. If on the small size (30-40MB+/-) I won't need to charge you anything. Please let me know size and I can be more precise.

Feel free to call or mail with any questions, and please let me know how you'd like to proceed.

Thanks.

**Kenneth Salk**

VP, National Sales

Salk Marketing Group

[954.968.1234](tel:954.968.1234)

[ken@salkmg.com](mailto:ken@salkmg.com)

[www.salkmarketing.com](http://www.salkmarketing.com)

[www.USBsmg.com](http://www.USBsmg.com)

#### *Online Marketing & Custom Branded Products*

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the system manager. Please note that any views or opinions presented in this email are solely those of the author and do not necessarily represent those of the company. Finally, the recipient should check this email and any attachments for the presence of viruses. The company accepts no liability for any damage caused by any virus transmitted by this email.



**From:** [g618034@qq.com](mailto:g618034@qq.com) [mailto:[g618034@qq.com](mailto:g618034@qq.com)] **On Behalf Of** w10939210

**Sent:** Thursday, July 29, 2010 6:29 PM

**To:** ken

**Subject:** Re:USB flash drive pricing...

Hi There,

How much do I need to add if I need a few files preloaded?

Xiaojing Wang

----- Original -----

**From:** "ken"<[ken@salkmg.com](mailto:ken@salkmg.com)>;

**Date:** Fri, Jul 30, 2010 05:20 AM

**To:** "w10939210"<[w10939210@sogou.com](mailto:w10939210@sogou.com)>;

**Subject:** USB flash drive pricing...

Hi Xiaojing:

Thanks for the opportunity to help, and here is the pricing you requested:

	1,500pc
1GB	\$5.39ea

These prices are subject to change.

Please let me know if you need pricing at any other memory capacity or quantity. Feel free to forward along your artwork/logo and we will create a 'digital mock up' for you to see how they will look-no charge!

This pricing includes:

- basic styles (some of the more popular basic styles include # 11, 27 and 39)
- bulk packaging (clear poly bag)
- Tier 1 Memory
- custom imprint of your logo (up to 3 spot colors)
- lifetime warranty

Have a look at [www.USBsmg.com](http://www.USBsmg.com) for additional style, as well as accessory and packaging options.

**QUESTION:** How can you DOUBLE or even TRIPLE the value of your promotional USB flash drives?

**ANSWER:** Add an aluminum Tin Gift Box: the tin gift box was was \$3.50 per unit, and now is only \$2.00.

Or a Velvet Pouch: the velvet pouch was \$1.50 per unit, and now is only \$1.00.

I would like to mention that we are a full promotional products company ( [www.salkmarketing.com](http://www.salkmarketing.com) ), offering thousands of other promotional products: T-shirts; hats; coffee mugs; water bottles; pens... etc...anything with your logo on it we can help with! Please let me know if you have any additional needs.

I am around for any questions you may have, and I will look forward to helping.

Thanks!

**Kenneth Salk**

VP, National Sales

Salk Marketing Group

[954.968.1234](tel:954.968.1234)

[ken@salkmg.com](mailto:ken@salkmg.com)

[www.salkmarketing.com](http://www.salkmarketing.com)

[www.USBsmg.com](http://www.USBsmg.com)

*Online Marketing & Custom Branded Products*

This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this email in error please notify the system manager. Please note that any views or opinions presented in this email are solely those of the author and do not necessarily represent those of the company. Finally, the recipient should check this email and any attachments for the presence of viruses. The company accepts no liability for any damage caused by any virus transmitted by this email.

CFgear

## CFgear Custom Flash Drives

发件人: **Aaron Morford** <aaron@cfgear.com> [查看](#) [添加](#) [拒收](#)

时 间: 2010年7月30日(星期五) 上午 6:49

收件人:

w10939210 <w10939210@sogou.com>

附 件:

1 个 (  [ACDA Proposal.pdf](#) )

Hi Xiaojing,

My name is Aaron, and I sent over a similar proposal a few days ago!

An order of 1500 drives would fall into the 1000 unit price break.

My next one begins at 2500 units. Would you be interested in that many?

I've attached my proposal from last week again just for your reference.

Thanks,

Aaron

## Aaron Morford

Project Manager

Senior Designer

CFgear.com

e [aaron@cfgear.com](mailto:aaron@cfgear.com)

p [800.371.1984](tel:800.371.1984) ext.7987

f [888.259.6889](tel:888.259.6889)

order form <http://www.cfgear.com/upload.html>

custom solutions in a flash™

© 2008 CFGear.com

CFgear flash drives are an enviro-friendly product

[Visit us on Facebook!](#)

ACDA  
Xiaojing Wang  
Pricing Proposal

Date: July 16, 2010

Quantity: 500

1-3 Color/Laser Etching: Included

Preload (up to 30mb): Complimentary

Storage size: 1 GB

Hardware\*:



Custom Flash Drives		
Flash Drive / Quantity	500	1000
<b>the Exactmatch™</b>		
256 MB	\$5.05/drive	\$4.95/drive
512 MB	\$6.20/drive	\$5.60/drive
1 GB	\$6.15/drive	\$5.65/drive
2 GB	\$6.85/drive	\$6.35/drive

\*Pricing subject to change due to the volatility of NAND Flash Memory marketplace  
Please contact Aaron@cfgear.com to receive most current pricing.

Accessories:

Plain Lanyards: \$0.30/unit

Custom Lanyards: \$0.60/unit (300 minimum)

Standard Shipping\*: INCLUDED

\*Ground via UPS in the continental United States

order form: <http://www.cfgear.com/upload.html>

Thank you,

**Aaron Morford**

Flash Drive Guru, North America

CFgear.com

e [Aaron@cfgear.com](mailto:Aaron@cfgear.com)

p 800.371.1984 ext.7987

f 888.259.6889

order form <http://www.cfgear.com/upload.html>



custom solutions in a flash™

© 2008 CFgear.com

CFgear flash drives are an enviro-friendly product

FlashCoast

From: Anthony Pfeiffer [anthony@flashcoast.com]

Sent: Tuesday, April 19, 2011 10:40 AM

To: Wang, Xiaojing

Subject: RE: USB Flash Drives

Hey Cathy,

The price includes preloading as well. Let me know if you have any other questions.

Thank you,

Anthony Pfeiffer

FlashCoast USB Sales Representative

<http://www.flashcoast.com>

PromoDealer Promotional Items Account Representative

<http://www.promodealer.com>

877-303-2043

-----Original Message-----

From: Wang, Xiaojing [mailto:cathw@WPI.EDU]

Sent: Tuesday, April 19, 2011 9:37 AM

To: Anthony Pfeiffer

Subject: RE: USB Flash Drives

Hi Anthony,

Is there a fee for preloading? Thanks!

Cathy Wang

---

From: Anthony Pfeiffer [anthony@flashcoast.com]

Sent: Tuesday, April 19, 2011 10:28 AM

To: Wang, Xiaojing

Subject: RE: USB Flash Drives

Hey Cathy,

Good to hear from you! You can preload just about the entire capacity of the drive or to be more specific about 995MB. Let me know if you have any other questions.

Thank you,

Anthony Pfeiffer

FlashCoast USB Sales Representative

<http://www.flashcoast.com>

PromoDealer Promotional Items Account Representative

<http://www.promodealer.com>

877-303-2043

-----Original Message-----

From: Wang, Xiaojing [mailto:cathw@WPI.EDU]

Sent: Tuesday, April 19, 2011 9:02 AM

To: Anthony Pfeiffer

Subject: RE: USB Flash Drives

Hi Anthony,

How much data may I preload to them? Thanks!

Cathy Wang

---

From: Anthony Pfeiffer [anthony@flashcoast.com]

Sent: Tuesday, April 19, 2011 9:26 AM

To: Wang, Xiaojing

Subject: USB Flash Drives

Dear Cathy,

Thank you for inquiring at FlashCoast.com, the #1 USB Flash Drive Supplier in the U.S.! My name is Anthony Pfeiffer, and I will be your account representative here at FlashCoast. At any point, please ask me about free samples, or a free mock up with your logo. Please find your custom FlashQuote attached.

To proceed with the order, please reply to this e-mail by filling in the following:

- \* Confirmation to proceed with quoted item(s)
- \* Company Name:
- \* Your Name:
- \* Phone Number:
- \* Fax Number:

- \* Shipping/Billing Address:
- \* Your logo as Vector Art (in either EPS or Illustrator format)
- \* Needed Delivery Date:
- \* Color of Drives:

Once all of the above information is received, we will begin processing your order. You will receive an invoice and credit card form within 24 hours along with an e-Proof with your logo on your chosen product! Once approved, you will be receiving your product within 10-15 business days plus shipping (unless otherwise noted).

We appreciate you choosing FlashCoast as your promotional vendor and look forward providing your firm with all of its promotional needs. Please call us at any time with any questions you may have or if you need further information on our products. Thanks!

Best Regards,

Anthony Pfeiffer  
877-303-2043

## USB Flash Drives

发件人: **Anthony Pfeiffer** <anthony@flashcoast.com> [查看](#) [拒收](#)

时 间: 2010 年 7 月 30 日(星期五) 凌晨 3:12

收件人:



w10939210 <w10939210@sogou.com>

附 件:

1 个 (  [FlashCoast Inquiry Form2 - Anthony Pfeiffer.pdf](#) )

Dear Xiaojing,

Thank you for inquiring at FlashCoast.com, the #1 USB Flash Drive Supplier in the U.S.! My name is Anthony Pfeiffer, and I will be your account representative here at FlashCoast. *Please find your custom FlashQuote attached.*

To proceed with the order, please reply to this e-mail by filling in the following:

- **Confirmation to proceed with quoted item(s)**
- **Company Name:**
- **Your Name:**
- **Phone Number:**
- **Fax Number:**
- **Shipping/Billing Address:**
- **Your logo as Vector Art (in either EPS or Illustrator format)**
- **Needed Delivery Date:**

Once all of the above information is received, we will begin processing your order. You will receive an invoice and credit card form within 24 hours along with an e-Proof with your logo on your chosen product! Once approved, you will be receiving your product within 10-15 business days plus shipping (*unless otherwise noted*).

We appreciate you choosing FlashCoast as your promotional vendor and look forward providing your firm with all of its promotional needs. Please call us at any time with any questions you may have or if you need further information on our products. Thanks!

Best Regards,

Anthony Pfeiffer

[877-303-2043](tel:877-303-2043)



877-303-2043

FlashCoast, LLC

Date:

July 29, 2010

Overall Leader in Promotional USB Products!

To: Xiaojing Wang

Salesperson	Job	Shipping Method	Shipping Terms	Delivery Date	Payment Terms	Due Date
Anthony Pfeiffer					Pre-Pay	

Qty	Item #	Description	Unit Price	Discount	Line Total
1500.00	F10	USB Flash Drive - 1GB	\$ 4.99		\$ 7,485.00
		<b>Free Four-Color Imprint</b>			
		<b>No Set Up Fees</b>			
			Total Discount		

Please remember that all FlashCoast USB Drives come with:

- **Free Four-Color Imprint**
- **Free Set-Up**
- **Tier-1 USB Flash Memory**
- **LIFETIME Warranty**
- **100% Customer Service**
- **Optional Packaging, Pre-Loading, or AutoRun.**

Subtotal	\$ 7,485.00
Sales Tax	
<b>Total</b>	<b>\$ 7,485.00</b>

We thank you for your interest in our products, and hope we will have a successful relationship in the time to come.

RELYmedia

**RE: RELYmedia Quote**

发件人: **Adam Miller** <adam\_miller@relymedia.com> [查看](#) [添加](#) [拒收](#)

时 间: 2010年7月30日(星期五) 上午 7:43

收件人:

'w10939210' <w10939210@sogou.com>

抄 送:

'Drew O'Brien' <drew\_obrien@relymedia.com>

附 件:

1 个 (  [Flash Drive Preloading Fees.pdf](#) )

Xiaojing:

My name is Adam, I work with Ryan. We can preload up to 100MB of data for free. For files larger than that, please refer to the attached preloading price sheet.

Thanks,

---

Adam Miller  
RELYmedia  
17113 Minnetonka Boulevard  
Suite 150  
Minnetonka, MN 55345  
Phone: (952) 314-4596  
Fax: [\(952\) 476-2095](tel:(952)476-2095)  
[adam\\_miller@relymedia.com](mailto:adam_miller@relymedia.com)  
[www.relymedia.com](http://www.relymedia.com)

---

**From:** [g618034@qq.com](mailto:g618034@qq.com) [mailto:[g618034@qq.com](mailto:g618034@qq.com)] **On Behalf Of** w10939210

**Sent:** Thursday, July 29, 2010 6:25 PM

**To:** Ryan Petersen

**Subject:** Re:RELYmedia Quote

Hi There,

Yes I am looking for 1GB USB drives, and how much do I need to add for preloading files?

Xiaojing Wang

----- Original -----

**From:** "Ryan Petersen" <[ryan\\_petersen@relymedia.com](mailto:ryan_petersen@relymedia.com)>;  
**Date:** Fri, Jul 30, 2010 03:07 AM  
**To:** "w10939210" <[w10939210@soqou.com](mailto:w10939210@soqou.com)>;  
**Cc:** "drew\_obrien" <[drew\\_obrien@relymedia.com](mailto:drew_obrien@relymedia.com)>;  
**Subject:** RELYmedia Quote

Xiaojing:

Our most common size flash drive is the 1GB, but we do have smaller sizes available which are cheaper. For 1,500 1GB base model flash drives with logo imprints the price per unit is \$5.05. Please let me know if this is what you are looking for.

Thank you for considering RELYmedia.

---

Ryan Petersen  
RELYmedia  
17113 Minnetonka Boulevard  
Suite 150  
Minnetonka, MN 55345  
Phone: [\(952\) 314-4596](tel:(952)314-4596)  
Fax: (952) 476-2095  
[ryan\\_petersen@relymedia.com](mailto:ryan_petersen@relymedia.com)  
[www.relymedia.com](http://www.relymedia.com)

-----Original Message-----

Sent: Thursday, July 29, 2010 2:01 PM  
To: [sales@relymedia.com](mailto:sales@relymedia.com)

Subject: Quote Submittal

First Name: Xiaojing

Last Name: Wang

Email Address: [w10939210@sogou.com](mailto:w10939210@sogou.com)

Day Phone: 5085219264

Service Type: FlashDup

Quantity: 1500

Deadline: December



17113 Minnetonka Boulevard  
Suite 150  
Minnetonka, MN 55345  
Phone: (952) 476-2094  
Fax: (952) 476-2095  
[www.relymedia.com](http://www.relymedia.com)

### **USB Flash Drive Preloading Fee**

101-250MB  
50-499: \$150 fixed  
500-999: \$.30  
1000-2499: \$.25  
2500-4999: \$.20  
5000+: \$.15

251-500MB  
50-499: \$200 fixed  
500-999: \$.40  
1000-2499: \$.35  
2500-4999: \$.30  
5000+: \$.25

501-750MB  
50-499: \$250 fixed  
500-999: \$.50  
1000-2499: \$.45  
2500-4999: \$.40  
5000+: \$.35

751MB-1GB  
50-499: \$300 fixed  
500-999: \$.60  
1000-2499: \$.55  
2500-4999: \$.50  
5000+: \$.45

1.01GB-1.5GB  
50-499: \$350 fixed  
500-999: \$.70  
1000-2499: \$.65  
2500-4999: \$.60  
5000+: \$.60

1.51GB-2GB  
50-499: \$400 fixed  
500-999: \$.80  
1000-2499: \$.75  
2500-4999: \$.70  
5000+: \$.65

2.01GB-2.5GB  
50-499: \$450 fixed  
500-999: \$.90  
1000-2499: \$.85  
2500-4999: \$.80  
5000+: \$.75

## **Appendix E – Meeting Minutes**

The meeting minutes for this project are attached on the following pages.

## **EACDA Project Meeting Minutes**

### **Date: June 17<sup>th</sup>, 2010**

#### **I. Last Week's Minutes**

Reading notes

#### **II. Old Business**

Secure pdf files

Need to do a survey on people's opinion about it, some people might like music on paper in order to play on piano, but pdf files could be provided with midi so people can hear the music.

cpdl.org main copyright types

Personal: the copyright is held by the editor or composer

Choral Public Domain Library(CPDL) License: users have the right to copy, distribute, perform, record, or edit the music with appropriate copyright notice.

So copyright of scores could be an issue depending on what type of copyright it has.

Could be helpful but need future explorations.

#### **III. New Business**

Interview Dr. Eaton to get his opinions especially concerns, on projecting choral scores. Also ask about the general opinion in ACDA as a group. Find out why the process hasn't been moving forward much for years. Discover how he could assist the project.

#### **IV. Goal Statement**

The goal of this project is to research the process and concerns of projecting choral scores during reading sessions at the conventions for the Eastern Division of the American Choral Directors Association (EACDA). This research is based on previous surveys and studies completed by WPI students at previous conventions and interviews with the current President of the EACDA. The final product will be a 20 minute presentation for the EACDA 2012 Convention Board that will present the findings of the research and demonstrate acceptable techniques for choral score projections at reading sessions during the convention.

#### **V. Action Items**

Research noteworthy Mac version

Explore whether Disc Makers do USB duplications at a low cost,

Read the bibliography of Professor Delorey's dissertation

Make a reservation at ATC for 2 projectors, 2 screens, and a laptop from Aug12th-Aug17th

Plan on designing a survey

Professor Delorey needs to talk to the publisher's, and send Cathy his dissertation

Dr. Eaton needs to send Tom's email to Professor Delorey



**EACDA Project Meeting Minutes**  
**Date: July 7th, 2010**

**I. Last Week's Minutes**

**II. Old Business**

Reservation at ATC  
Noteworthy Mac version  
Disc Makers

**III. New Business**

Get a license for surveying EACDA 2012 Convention Board

**IV. Goal Statement**

The goal of this project is to research the process and concerns of projecting choral scores during reading sessions at conventions for the Eastern Division of the American Choral Directors Association (EACDA). This research is based on interviews with the current President of the EACDA and surveys and studies completed by WPI students at previous conventions. The final product will be a 20 minute presentation for the EACDA 2012 Conferences Board presenting the findings from the research and demonstrating adequate techniques for choral score projections at reading sessions during the convention.

**V. Action Items**

Send them a usb key and get copies, put a quotes  
Design a survey  
How many pdf pages in one gigabyte, use cpdl.org to estimate  
List of things to suggest to choral directors, like Facebook...communication tools, upside of various technology  
Google scholar to find articles about projection

**EACDA Project Meeting Minutes**  
**Date: July 21th, 2010**

**I. Last Week's Minutes**

**II. Old Business**

- USB duplication cost
- Number of pages that 1GB pdf file could hold
- Survey

**III. New Business**

- iPad
- Use the iPad to test different PDF reader applications
- Powerpoint
- Start designing the PowerPoint presentation

**IV. Goal Statement**

The goal of this project is to research the process and concerns of projecting choral scores during reading sessions at conventions for the Eastern Division of the American Choral Directors Association (EACDA). This research is based on interviews with the current President of the EACDA and surveys and studies completed by WPI students at previous conventions. The final product will be a 20 minute presentation for the EACDA 2012 Conferences Board presenting the findings from the research and demonstrating adequate techniques for choral score projections at reading sessions during the convention.

**V. Action Items**

- Get a quote for 1500 USB keys
- Find out how to write a survey effectively
- Get familiar with the functions of an iPad
- Work on the PowerPoint
- How many pages of music does a singer reads everyday

## **EACDA Project Meeting Minutes**

### **Date: July 30th, 2010**

#### **I. Last Week's Minutes**

#### **II. Old Business**

USB duplication cost

usbsmg.com: \$8085, 30-40MB

cfgear.com: \$8475, 30MB

flashcoast.com: \$7485, unit, maximum cost

relymedia.com: \$7575, 100MB

Updated Survey

put logos on circle number , center line, put numbers in

It was easy to follow the projected music with someone else turning the pages

Having a sheet to write comments on during the reading is very helpful

Projected choral music survey

iPad pdf readers

GoodReader: 0.99 handle a large variety of documents with different formats, can be connected by WiFi, Google Docs, Dropbox, etc, but when turning pages the next page is not rendered instantly

Cloud Readers: free, use USB cables or WiFi to get pdf files, renders fast , can play two pages side by side

Stanza: as fast, has an integrated dictionary, display thumbnails of books and magazines

PDF Reader: 0.99 fast, get files from the build in web browser or even to certain IP addresses, doesn't have a search feature

PowerPoint

Two parts, One for projection and one for digital choral folder(future of ....)

Numbers of score pages that a musician reads daily

Put music along the score in PowerPoint

Ave Verum Corpus

#### **III. New Business**

#### **IV. Goal Statement**

The goal of this project is to research the process and concerns of projecting choral scores during reading sessions at conventions for the Eastern Division of the American Choral Directors Association (EACDA). This research is based on interviews with the current President of the EACDA and surveys and studies completed by WPI students at previous conventions. The final product will be a 20 minute presentation for the EACDA 2012 Conferences Board presenting the findings from the research and demonstrating adequate techniques for choral score projections at reading sessions during the convention.

#### **V. Action Items**

## Appendix F – Bibliography

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