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Picture Archive and Sharing Standard (PASS)

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An Initiative by

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Executive Summary

The Picture Archive and Sharing Standard (PASS) is a digital imaging industry initiative aimed at optimizing the digital imaging experience for consumers. PASS invites participation from the consumer electronics, software, photographic, and imaging industries to effectively accomplish this goal. PASS will enable participating companies to offer significant new value propositions to consumers. Stated simply, PASS will allow consumers to easily save, print, playback, and share digital images in ways that were not accomplished easily or reliably before. PASS will use optical storage as the primary means of sharing digital images. Other media will be used when optical media is inappropriate. PASS will define how information will be encoded on the media so that products from all participating companies can understand the information on the media.

Ultimately, PASS is about giving consumers the same convenience and choices as the current film-based systems, while adding the advantages and convenience of digital photography.

This initiative is made possible through these core elements:

- A specification suite that describes how to encode information on removable storage media
- A PASS Logo, Trademark, and Licensing Program
- A specification that describes common user interface requirements for systems that display the PASS Logo

For the consumer electronics, software, photographic, and imaging industries, PASS will build bridges and help lower costs. For consumers, PASS will remove barriers and provide capabilities that allow digital photography to be a fun, hassle-free experience.

To participate, companies become members of the PASS initiative. The initiative exists to create the required standards, help participating companies leverage the standards, and to encourage manufacturers of consumer software and photographic/electronic equipment to apply the standards.

The PASS initiative invites participation from all companies that handle or manage consumer images/content to fulfill the promise that consumers will be able to easily enjoy their content now, and in the future.

Introduction

This paper provides an overview of PASS, describing the initiative and its benefits. Most importantly, it illustrates how consumers benefit.

This paper does not provide the technical specifications of PASS.

What is PASS?

PASS defines a file interchange environment that will link the consumer software, electronics, photographic, and imaging industries. The overall goal of PASS is to facilitate the sustained growth of the industry. The mechanisms to achieve growth are to create new business opportunities for participating companies and to improve the consumer experience. PASS is aimed at solving problems for consumers and businesses.

For businesses, the benefits are many. PASS will allow businesses to participate in the market in new ways, creating new revenue streams. Current products can be made to function with other products, even if the other products are made by another company in a different industry. Participating companies decide how their offerings are positioned, and how they function with products of other companies that participate in PASS.

All member companies also benefit from the joint effort to increase market awareness.

PASS can be described on different levels. It is:

- **an Association of digital photographic and imaging industries and companies** that shares the goal of market development and sustained growth. These companies are given a platform and tools that enable them to participate and grow.

- **a technical system architecture** through which the member companies can offer and make use of common standards. The architecture is based on standards that are independent of language and platform, enabling functionality among dissimilar systems.

- **an open system** based on published standards that allow member companies to build products that address their business needs, and conform to specifications that guarantee functionality that is recognized by consumers by the presence of the PASS Logo.

- **a set of newly enabled consumer value propositions** that provide what consumers want from the digital photography industry, and give member companies new ways to satisfy their customers and derive profit.

PASS is the synergistic combination of these elements. By joining forces, member companies benefit by leveraging the combined investment and involvement of the other members.

The Need For PASS

The consumer digital imaging industry has the potential for substantial growth. Yet today, several factors are standing in the way, slowing the growth rate. These factors can be described from the perspective of consumer and business issues.

Consumers

Today, many consumers are unaware of the full benefits of digital photography. Many who know of digital photography see it as something "high tech," complex, and with limited usefulness – good for viewing images on cameras and emailing, but little else.

Consumers who understand the potential benefits of digital photography may have issues with current systems. Their experience in trying to "do more" with digital photography has its difficulties. In particular, it is not obvious to them that they can view the images on the CD they get with their pictures on their home DVD player. The same is true for simple jpeg files on a CD that was made on a home PC.

With the various products, software, and devices that handle or manage consumer images/content, comes increased uncertainty that the different components will work well together. PASS will be the bridge that enables the functionality of digital content between different systems.

If the problems that consumers experience are not resolved, all industries will experience far less growth than there is potential. This would mean lost opportunities to expand the use of pictures through the potential of digital photography. Ultimately, the photographic, consumer software, and electronics industries will be less than they can be as opportunities for up-sell, cross-sell, and expanded imaging uses would be limited or lost.

Businesses

Many industry participants are aware of the consumer issues. By and large, each participant has been trying to single-handedly resolve these complex problems. A direct result is that one solution may be incompatible with the next, because it was built without a common standard.

This, too, translates into slowed growth. Often, companies are required to invest in parts of the value chain that do not deliver direct consumer value or are not within the company's core competences. Additional resources are needed, incremental costs incurred, and deployment is slowed. Would-be third-party innovators in specific aspects of the value chain are locked out. Perhaps worst of all, consumers are not well served. Ultimately, they experience barriers instead of choices. What consumers prefer is a fluid marketplace that serves their needs at any time or place – whether at home, on the road, or on vacation – without limiting their possibilities.

How PASS Addresses Industry Needs

The consumer digital photography industry needs an environment that will foster growth. It needs conditions that will allow each business to focus on what it does best, delighting their customers, and partnering with businesses for other requirements of the value chain. It needs conditions that provide consumers with freedom of choice – and a wide variety of choices that cater to a variety of needs. The industry needs conditions that encourage the development of a strong and diverse competitive base while allowing businesses to develop and maintain consumer loyalty.

PASS intends to provide such an environment.

PASS will enable the sharing of Digital Content

Digital content exists in the form of still images, video, audio or music, and graphics. Technology has enabled these various digital formats to be edited, copied, and merged. Additionally, there are different devices that use different digital formats, such as digital still cameras, DVD players, digital video cameras, and cell phones. However, unlike PCs, these devices cannot handle/playback multiple formats, although this technology is slowly evolving.

PASS defines the formats that are preferably used. PASS defines a format for optical media so that devices, such as DVD players, have a finite set of formats to use when they are upgraded to multiple format capabilities.

## PASS is Industry-Enabling Standards

The specification of PASS can be compared to the standards that have made the traditional consumer photography industry possible: Process C-41, standard filmstrip and cartridge configurations, paper formats, etc. Without these standards, photography would have been limited to hobbyists. With them, photography has grown into a large, highly successful, mainstream consumer industry. The specification of PASS promises to do much the same thing for digital photography.

Use Case Scenarios

Use case scenarios allow us to demonstrate how PASS will translate into real advantages for consumers and businesses. Here are a few examples that show some of the capabilities, features, and workflows that PASS will help facilitate.
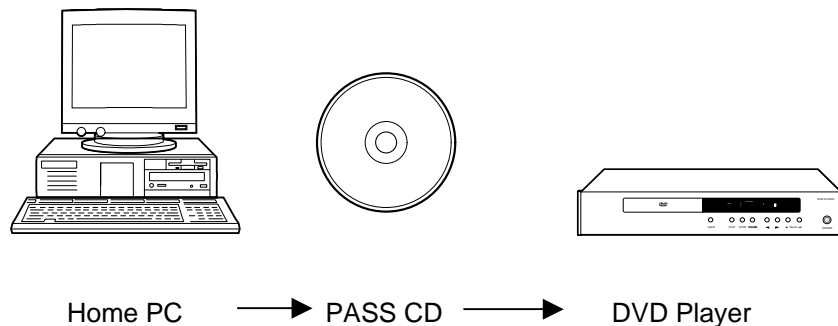
Scenario #1

Consumers can have their imaging content (i.e., images from film, digital stills, and video) placed on CDs in the PASS format as part of a retail photofinishing order. If the DVD player in the consumer's home displays the PASS logo that is also on the CD, the consumer is sure that the CD will play their content correctly. In fact, the playback experience is consistent, regardless of who manufactured the CD and DVD player. The PASS specification enables this experience even on legacy DVD players – creating a bridge from today's technology, to tomorrow's technology.

Retail Photofinishing ⟶ PASS CD ⟶ DVD Player
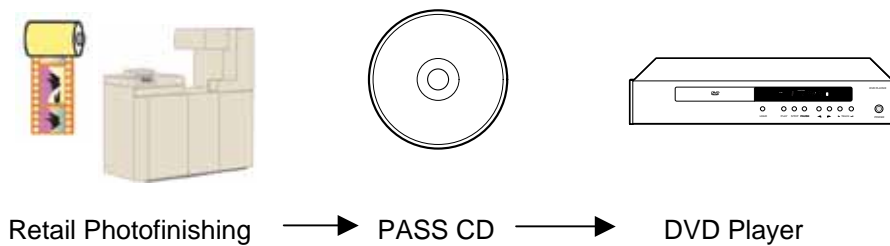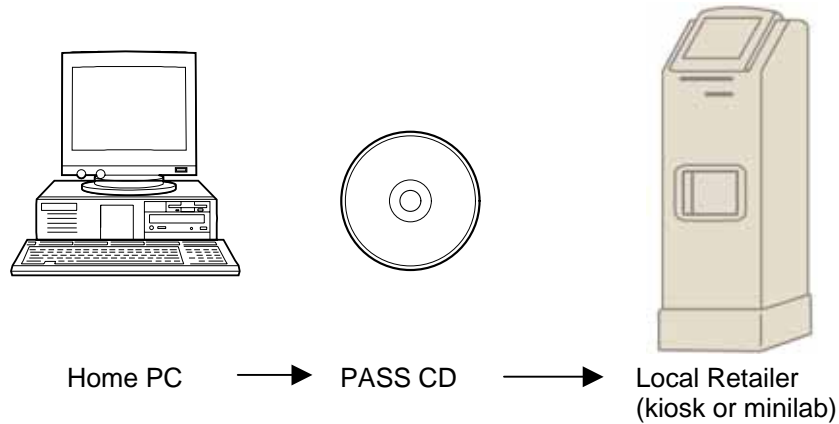
Scenario #2

A consumer uses a software application on their home PC to work with their pictures and video content. They want to create a CD or DVD with pictures, video, and music that can be played on their home DVD player. Making a CD or DVD that is PASS-enabled will ensure the desired playback on a DVD player that is PASS-enabled.


Home PC ⟶ PASS CD ⟶ DVD Player

Scenario #3

A consumer uses a software application on their home PC to work with their pictures and video content. They want to use their pictures to create a CD (or DVD) that they can use at their local retailer to make prints. The consumer writes the image files of their pictures to a PASS-enabled disc and brings the disc to a local retailer. The retailer's kiosk recognizes that it is a PASS-enabled disc for printing, and provides a streamlined workflow for the best possible printing experience for the consumer.

Home PC   ⟶   PASS CD   ⟶   Local Retailer (kiosk or minilab)

Scenario #4

Consumers can have their imaging content (i.e., images from film, digital stills, and video) placed on a CD that is PASS-enabled as part of a retail photofinishing order. Consumers can then use the PASS-enabled CD on their home PC. Consumers are delighted when they see that the software of their PC recognizes the PASS format, and automatically handles their images and content in a way that makes it very easy for them to work and play with their pictures/content.

Retail Photofinishing   ⟶   PASS CD   ⟶   Home PC
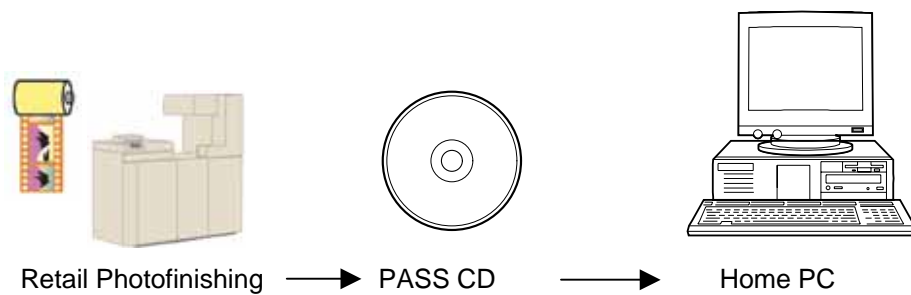
Life Without PASS – A Guide to its Value

The examples above depict new value propositions that are significant for consumers. While all of the examples may be possible today, the availability and consistency for the consumer is lacking.

The following table provides a quick reference that describes the current situation without PASS, and the future situation with PASS.

Consumer or Industry Need	Current Situation (without PASS)	The Future with PASS
Retail photofinishing equipment that can generate CDs and DVDs with multiple content types (e.g., jpg, mpg, mp3, etc)	Systems must convert all content to one type. Time-consuming and somewhat prohibitive in some situations (e.g., kiosk).	Systems do not have to convert content. PASS will use the native, "best" format saving disc creation time.
Consumers create CDs and DVDs at home with multiple content types (e.g., jpg, mpg, mp3, etc) for use on home DVD players	Home PCs must convert all content to one type. Very time-consuming.	Home PCs do not have to convert as much content. Can create discs much faster by using the native, "best" format.
Consumer has CD made at local retailer from film or digital still camera images, to view as a slideshow on a home DVD player	Consumer gets varied experiences, including failure to play, depending on the manufacturer of the DVD player.	Consumer's experience is consistently good across different DVD players, as players recognize and use the native files.
Consumer brings CD with images to a local retailer to make prints on the kiosk	Consumer gets varied experiences, depending on the manufacturers of the CD and kiosk.	Consumer's experience is consistently good across different CDs and kiosks.
Consumer wants to consolidate/migrate their image CDs to DVDs	The organization of the images, content, and/or metadata may not be carried over to the DVD.	The organization of the images, content, and/or metadata is retained on the DVD (or any new, future storage media).

The Architecture

The PASS Specification Suite

PASS provides a Suite of Specifications. Each specification pertains to a specific part of the system. The Specification Suite comprises the following:

PASS Logical Disc Specification
This specification describes the data structure of a PASS Digital Album. A Digital Album is any removable storage medium that supports a file system and contains the data structure identified in the Logical Disc Specification. The data structure includes the file directories, the image or audio files (i.e., the asset files of the consumer), and special files used to support the system features.

PASS Originating/Authoring System Requirements Specification
This specification describes the capabilities needed by a system that creates PASS Digital Albums. The requirements for merging multiple PASS Digital Albums into one Digital Album are described in this specification.

PASS Receiving/Playback System Requirements Specification
This specification describes the capabilities needed by a system that plays the content of a PASS Digital Album. It describes how the information described in the PASS Logical Disc Specification is to be interpreted. The requirements for album selection and metadata display are described in this specification.

PASS will also enable logo and certification requirements to establish and ensure compliant systems.
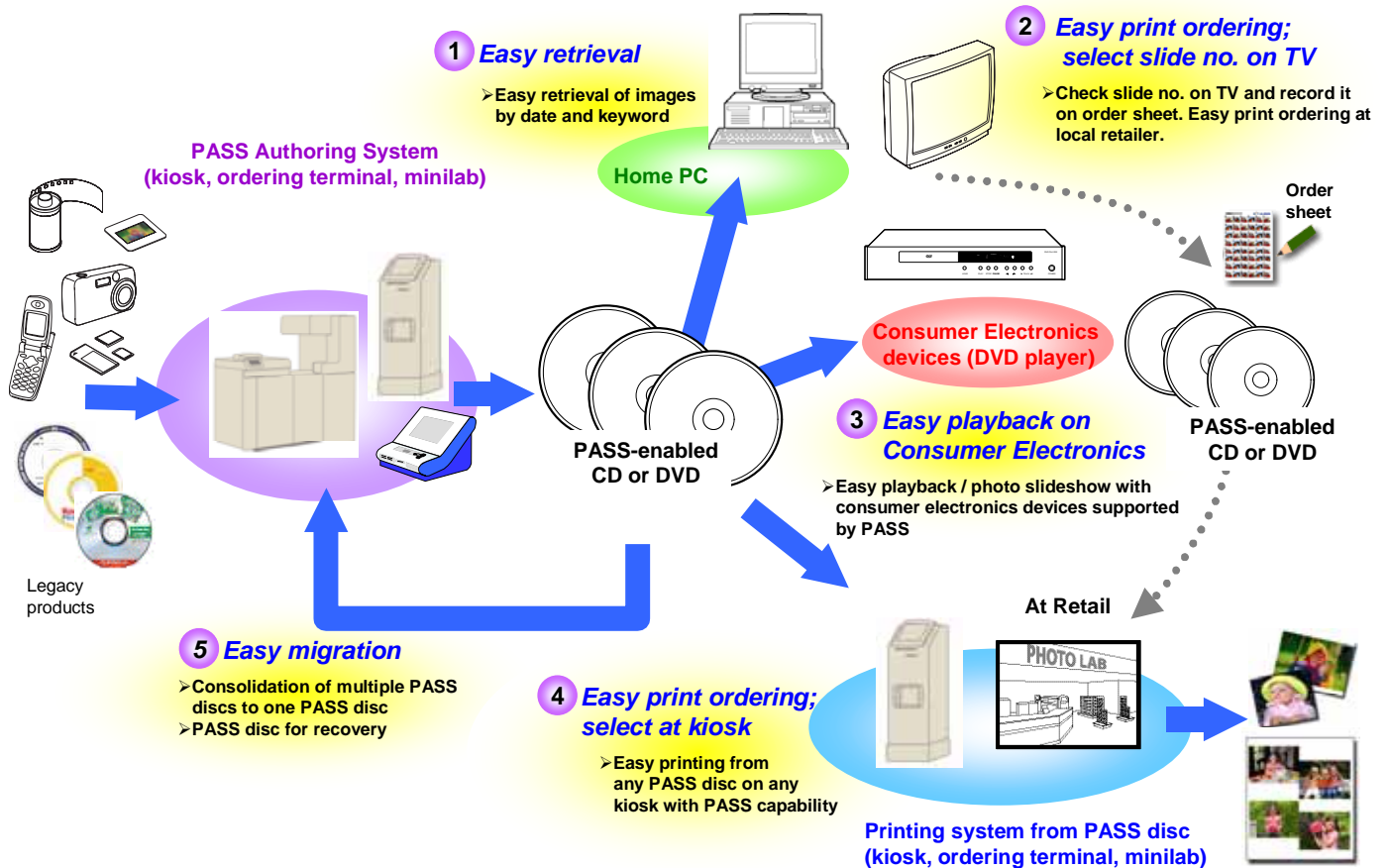
The following figure shows the organization of the PASS Specification Suite.
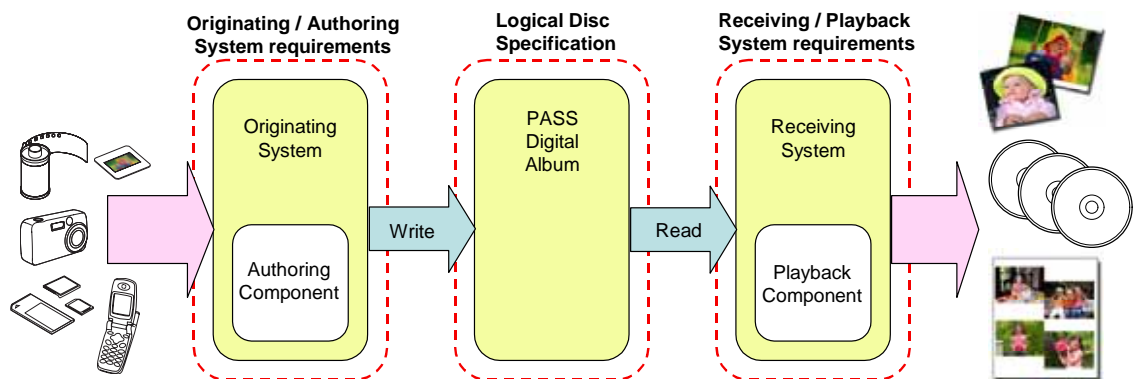
Features of PASS

PASS defines an interchange environment that enables many different uses. Consumers can use their Digital Albums with equipment from any vendor that displays the PASS Logo.

The following figure shows five features of PASS.

① *Easy retrieval*
➢Easy retrieval of images by date and keyword

② *Easy print ordering; select slide no. on TV*
➢Check slide no. on TV and record it on order sheet. Easy print ordering at local retailer.

Home PC

Order sheet

PASS Authoring System (kiosk, ordering terminal, minilab)

Consumer Electronics devices (DVD player)

PASS-enabled CD or DVD

③ *Easy playback on Consumer Electronics*
➢Easy playback / photo slideshow with consumer electronics devices supported by PASS

PASS-enabled CD or DVD

Legacy products

At Retail

⑤ *Easy migration*
➢Consolidation of multiple PASS discs to one PASS disc
➢PASS disc for recovery

④ *Easy print ordering; select at kiosk*
➢Easy printing from any PASS disc on any kiosk with PASS capability

PHOTO LAB

Printing system from PASS disc (kiosk, ordering terminal, minilab)

Leveraged Specifications

PASS has leveraged other industry standards whenever possible to enable the interchange environment used by a PASS Digital Album.

The PASS specifications identify a minimum set of file format specifications to minimize the number of encodings a PASS-compliant product needs to support.

PASS also leverages the Music Photo Video (MPV^{TM}) specifications developed by the Optical Storage Technology Association (OSTA). The MPV specifications by themselves do not enable a full interchange environment, because MPV does not specify or restrict file formats. The PASS Logical Disc Specification provides this. PASS uses a MPV manifest to describe PASS Digital Albums. This enables multiple albums to be described on one removable medium (i.e., the PASS Digital Album). MPV is what enables the components described in the PASS Logical Disc Specification to be recorded with multiple file systems and directory structures. PASS defines a few extensions to MPV to support the migration of customer assets. (For more information, see the *PASS Logical Disc Specification.)*

Initial implementations of PASS will use the CD and DVD technology. Consequently, UDF and ISO 9660 will be the file systems used by PASS.

Summary of Benefits

PASS exists to enable sustainable growth for the consumer digital photographic, imaging, software, and electronics industries. Its primary initiative for doing so is the creation and operation of an industry-wide digital file interchange environment.

Benefits for the Consumer

- PASS provides a useful and easy means for consumers to enjoy their pictures/content in the new digital world:

    - Easy viewing on DVD players / electronics devices

    - Easier to use on home PCs (e.g., organizing, viewing slideshows, etc)

    - Easier to order prints and additional products

Benefits for the Photographic Industry

- Fulfills the promise to consumers that they will be able to enjoy their pictures in the new digital world as easily as they have in the past

- Provides a focused set of specifications to follow

- Possibly increases the value of their devices for consumers thereby driving incremental sales

Benefits for the Consumer Electronics, Imaging, and Software Industries

- Fulfills the promise to consumers that they will be able to enjoy their pictures in the new digital world as easily as they have in the past

- Provides a focused set of specifications to follow

- Possibly increases the value of their products and services for consumers thereby driving incremental sales

Support PASS

The success of the PASS Initiative depends on industry participation and support. To learn more or to inquire about becoming a member of the PASS Initiative, please contact:

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