Introduction

The purpose of DiPFI, the Digital Picture Frame Interface, is to provide a convenient, inexpensive means to display digital photographs stored on a personal computer or laptop connected to the internet via an Ethernet connection. The box acts as an interface between a standard Ethernet port and any standard VGA monitor, effectively turning said monitor into a Digital Picture frame capable of displaying any photographs stored on the central server.

Image data will be decoded on the server to a raw .ppm format and transferred to the product using TCP/IP and then buffered on the Rabbit Microcontroller core module. The image data is then output to the Epson graphics controller, which performs the necessary digital to analog conversions. The graphics controller is interfaced with a 4 Mb EDO DRAM memory chip and a standard VGA port to output the analog image data. These operations are conducted by the Rabbit microcontroller, which deals with remote/native button presses that signal various display modes.

Several patents were found that, at first glance, covered similar functions as those performed by the Digital Picture Frame Interface. However, upon further verification, it was found that only one patent poses any threat with respect to issues of patent liability. This device, marketed by Ceiva, Inc, consists of an LCD "frame" that dials in to a central repository and downloads images to be displayed on the device. This device performs a similar function to DiPFI; however, we feel that our device is an improvement because any used VGA device can become a digital picture frame.

Results of Patent Search

Upon researching patents at <u>www.uspto.gov^[1]</u>, the following patents described in Table 1 were deemed relevant to the product being designed.

Patent #	Description
6,442,573	<i>Method and apparatus for distributing picture mail to a frame device community</i> ^[6]
6,167,469	Digital camera having display device for displaying graphical
	representation of user input
	and method for transporting the selected digital images thereof $^{[5]}$
6,111,586	Electronic photo album editing apparatus ^[4]
6,058,428	Method and apparatus for transferring digital images on a network ^[3]
6,037,989	Still image transmitting device ^[2]

 Table 1. Patent #'s and Descriptions of Relevant Patents

1. Patent 6,037,989 - This invention converts the image signal reproduced by a camcorder, TV, or VCR into serial data and transmits it to a personal computer as a still image signal, thereby making it possible to edit, store, or print the image signal, resulting in convenient use^[2]. This device utilizes several transmit control signals to effectively transmit image data into a computer's serial port from an image sourcing device. Though this device transmits a still image to be displayed, which is similar in function to the DPB being designed, it involves transmitting data serially <u>to</u> a PC from another device. Therefore, the DPB does not infringe on this patent.

2. Patent 6,058,428 - Described here is a method and apparatus for transferring digital images on a network. A signature list is examined wherein the signature list includes a unique signature for each of the digital images requested for transfer^[3]. The signature list is used to determine whether each of the digital images is present, and the images are checked for integrity. This provides an efficient means of tracking, recording, and processing image requests over a network. The DPB does not, however, infringe on this patent as the designers plan on implementing their own methods for sending images which do not involve the processes described within this patent.

3. Patent 6,111,586 - The apparatus described is an object to provide an electronic photo album editing apparatus which can easily edit an electronic photo album in compliance with a user's various wishes^[4]. This apparatus displays images stored on a personal computer to the computer's monitor in the form of a photo album giving the user a direct interface with which to edit said photographs and corresponding decorative elements. However, this is all generated in software and the DPB does not perform any digital signal processing on the given images as the box expects to receive raw 640 x 480 image data.

4. Patent 6,167,469 - In this patent, a method and apparatus for transporting digital images is described^[5]. This apparatus pertains to the direct connection of a digital camera to a communications network for the transfer of said media. One embodiment of this system pertains to uploading the digital images to a website for direct display. The DPB connects to a network in much the same fashion, however, the patent pertains to the implementation within a digital camera, and does not relate to the image transfer being performed in the DPB.

5. Patent 6,442,573 - "A method and apparatus for distributing picture mail to a frame device community" is described. The present invention comprises one or more interconnected frame devices. Each frame device has a display region (e.g. an LCD) surrounded with a border region modeled to resemble a traditional picture frame. Each frame device is configured to connect to an interconnection fabric to periodically obtain image data from a centralized repository and then display that data according to criteria established by an authorized user. The data repository is populated with image data via the image collection process. Other information such as the behavior characteristics of each frame device are established and/or managed via a picture box. The picture box resides on a server computer and may be obtained by the user upon demand." ^[6] This patent very closely resembles the functions performed by the DPB, and thus it will be the main topic of discussion with respect to the patent liability analysis.

Analysis of Patent Liability

1. Literal Infringement

All aforementioned tasks involve the processing, transferring, and display of digital images, however none perform exactly the same function in exactly the same way as the DPB. Therefore, the DPB does not pose any literal infringement to any product currently on the market.

2. Doctrine of Equivalents

As was mentioned previously, Patent 6,442,573 was the only patent found that the DPB may infringe upon under the Doctrine of Equivalents. This product has been released by the company Ceiva located at <u>www.ceiva.com^[7]</u>. The following characteristics of the patented device are similar to those devised for the DPB. The device described in this patent consists of a viewer or receiver that will be programmed to access a centralized repository via a telecommunications network using a modem or other network device (i.e. an Ethernet connection). The device is preprogrammed to access the repository to download and store any images uploaded to the server. The frame device comprises a CPU, memory, and telecommunications hardware. The inventors also describe what they call a "picture box," which differs completely from the DPB as defined here. The "picture box" they describe is a software utility that allows the user to configure specifications such as image update frequency for the frame device, and appears as a menu on the frame devices LCD screen. This is much like the text overlay that will be generated on the DPB. Data is also transmitted via picture mail and any image processing needed to fit the image to the display is done before transferring the data.

Unfortunately, the DPB performs, substantially, most of the same functions described previously in substantially the same manner. One difference is that the patented device contains its own frame device LCD display, whereas the DPB provides the internal circuitry and VGA output without the extraneous cost of the LCD display. Another difference is that the DPB does not store image data onboard other than the picture being displayed, while this device downloads and stores all pictures in internal memory. This allows the DPB to be as inexpensive as possible.

Action Recommended to Avoid Infringement

To avoid infringement, two courses of action can be taken. Unfortunately, it would be very difficult to adjust the DPB at this point in the design process so that it would not infringe on the item described in Patent 6,442,573. Therefore, the two options are paying royalties to obtain the rights for marketing the DPB or keep the DPB as a "personal project" that will only be used for recreational purposes. In keeping with the true spirit of the design project, the second option seems the most valid.

If any monetary payment was desired for this product, several steps would first need to be taken. First of all, a more exhaustive patent search performed by an independent firm would need to take place to determine if there are more potential infringements. If this search is negative, then a patent lawyer would need to be located to review the patents already located, especially Patent 6,442,573. If it were determined by a more credible source that the DPB indeed infringed on this patent, Ceiva would need to be contacted to find out what royalties need to be paid for the distribution of the DPB, and even this might not be sufficient to avoid legal action. This would be a very expensive process, and some indication that the DPB would be a commercial success would be desired before these actions would be pursued.

References List

 ^[1] United States Patent and Trademark Office <u>www.uspto.gov</u>.
 ^[2] United States Patent 6,037,989: Still image transmitting device.

^[3] United States Patent 6,058,428: *Method and apparatus for transferring digital images on a network.*

^[4] United States Patent 6,111,586: Electronic photo album editing apparatus.

^[5] **United States Patent 6,167,469:** *Digital camera having display device for displaying graphical representation of user input and method for transporting the selected digital images thereof.*

^[6] United States Patent 6,442,573: *Method and apparatus for distributing picture mail to a frame device community*

^[7] CEIVA Logic, Inc.: www.ceiva.com.

*Note: References [2]-[6] found by performing patent search at [1]