# Latest defense against skimming: Switchable Privacy Filter

In a multitude of countries today it is becoming more and more vital for devices used for payment or secure transactions to have a higher level of privacy from unauthorized viewing such as at ATM machines; Payment Terminals; PIN Entry devices etc. Today, PIN skimming is not something new, but the method has taken a major leap compared to how it was done many years back and criminals are constantly inventing new techniques to undermine weaknesses in security. Latest invention has always been the key to effectively defend against crime now and in the future. Manufacturers, especially for ATMs and POS, need an anti-skimming solution that is effective enough to minimize the threat immediately. At the same token, there are design and dimension requirements that ask for a highly integrated, compact solution.
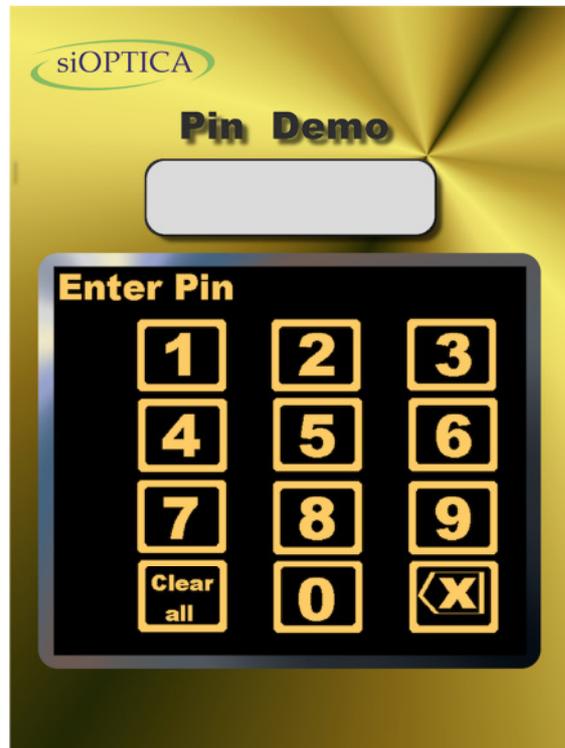
In the area of privacy filters, most available solutions today have major disadvantages such as lowering the brightness of existing LCD screens by a factor of 2 or more, and they do limit the device to be used only in privacy mode. These issues strongly limit the usability for the Manufacturers and their clients. siOPTICA had recently come up with a solution to the above by way of Switching between a privacy and a normal mode, and at the same time reducing the brightness losses by the privacy filter.

"Latest invention will always be the key defense mechanism against crime."

-Dr. Markus Klippstein, CEO

How does this work?

The switch ability is done by software in conjunction with a special optical filter on the display panel that allows toggling between a standard "public" mode (full resolution view from any angle) and privacy mode (partial or full panel size) with restricted viewing angle. The principal benefit of the technology is shown in the illustration below:
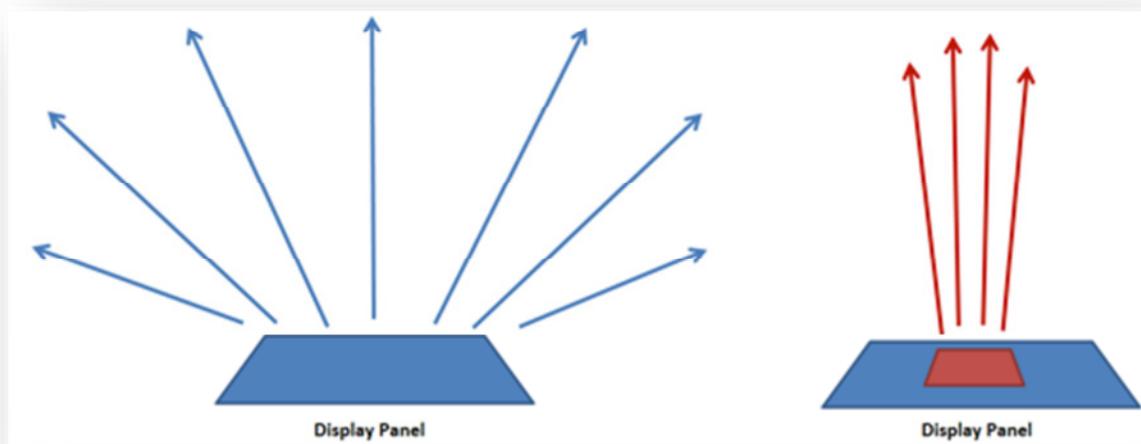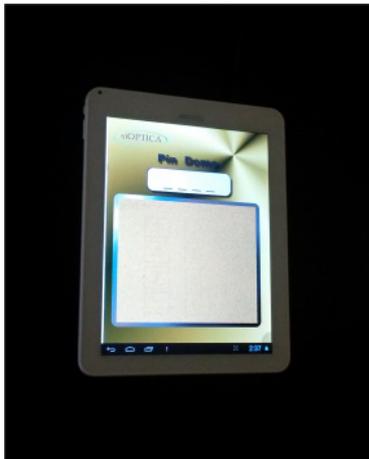

Public Mode:

No Viewing Restrictions

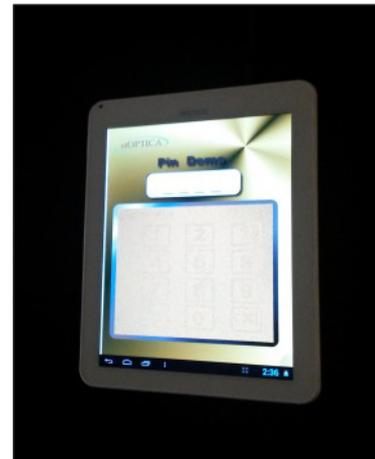Private Mode:

Only visible from selected angle

View from Left   **View from Centre**   **View from Right**

Based on our studies on the needs of privacy in certain industries, there are several ideas of implementing an Anti-Skimming method particularly on ATM, Payment Kiosks and eventually on mobile devices. On the assumption that the information display would come with touch capability, one can then place a virtual PIN PAD on the touch display that can be randomly moved on the display. The Touch Panel can now offer a PIN Entering function with full privacy functionality. The contents can be randomly located on the touch screen but usually without shuffling or randomizing the figure 0-9 standard configuration. The angles of privacy in x- and y- directions can also be modified according to the specification demanded by the client. This way, such a setup provides a new level of flexibility. This method is as secure as having an anti-skimming cover on a PIN Pad, or possibly even more secure. Ideally, the mechanical PIN pad may not be used any longer as the onscreen PIN Pad works in similar fashion. Additional features may also be added such as head or eye tracking where the private content will only be shown to the person standing directly in front of the ATM machines, by following the eye positions even under head movement.

In privacy mode, the privacy content (part or full screen) is processed by a software library. The parameters of the privacy filter are preset inside the library prior to installation and may be unique for each filter or can be the same for defined clusters of filters.

This means, any client's application calling-up the privacy mode should:-

a) Create the image (or parts) designated for private viewing (such as e.g. a PIN pad or Keyboard)

b) Provide this image (or parts) along with the exact position and size to the software library by means of application interface (API)

c) Receive the image (or parts) and depict it exactly at the given position and at the given size (no zooming or movement possible without re-calling the software library)

The private content usually have single foreground colour and single background colour and most preferred colours are red, green, blue, white, black, yellows, cyan or magenta.

In several other applications, privacy content may be pre-calculated and stored as fix images in the application, such as a PIN-PAD image. In this case, no software adaptation may be

required in the client application. For those items that need real-time and/or interactive change of the privacy content, the siOPTICA library should be included.

The following picture shows a sample content designed for Privacy depiction that can be processed by the content tool:


This PIN Pad (part of the image only in this case) has background colour black and foreground colour yellow.

Software to Drive the Privacy Mode

The privacy content generation is done via proprietary software and it is divided into two parts, which is "Offline" and "Real-Time". The Offline content generation tool, called Image Creator, has the function to pre-rasterize content with specified properties that will match the parameters of the privacy filter.
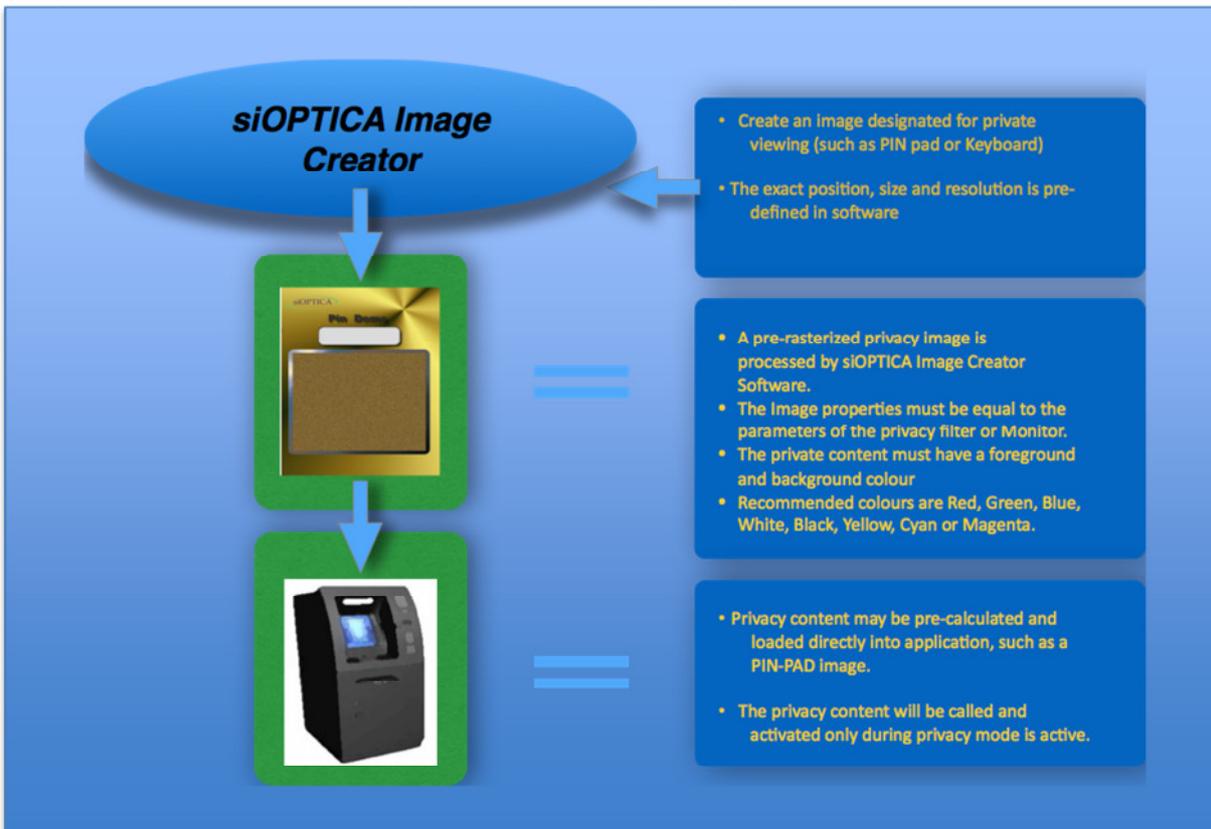
For a Real-Time solution, an SDK library can be integrated into client's existing image processing software. The SDK Library loads and defines the specified properties and matches the parameters of the privacy filter. The illustration below shows how the software is used to generate privacy content in relations to an ATM installation.
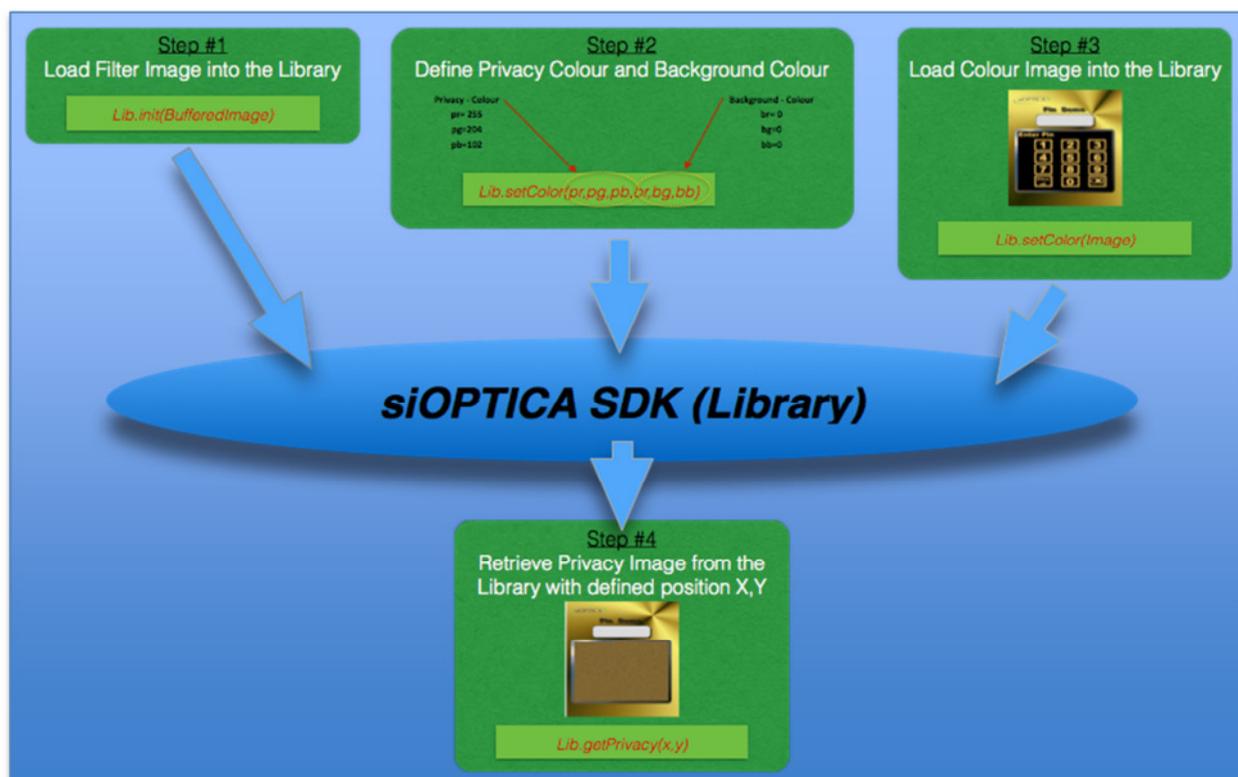
Hardware Integration

The privacy filter is designed and manufactured according to the specification of the LCD (or other type of flat) panel. The filter can then be integrated directly on the display panel. However, it is recommended that the installation process shall be done in a controlled environment.

USPs of the Technology

The key unique proposition of the technology is providing flexibility to the clients and consumers by the **ability to switch between privacy to standard mode**. Most ATM/Kiosk machines are fitted with a privacy filter but it is generally a permanent solution. Providing this flexibility, the users and the applications itself are able to choose between a privacy and non-privacy (public) mode while at the same time

brightness loss is very low. Data security is most important, therefore the technology is also flexible both with regard to the horizontal and vertical visible sweet spot angle in privacy mode, and these **angles are also adjustable according to the requirements of the clients**. It can be adjusted to a very narrow angle or wider to give more freedom of movements.

Even an eye tracking of the visible sweet spot in privacy mode can be implemented to adjust the screen in real time so as to follow user head movement while still preventing other users from seeing private contents.

The technology is patent pending.

Fields of Application:

The technology can be applied onto various fields needing on-screen privacy. One of the fields in particular is in ATMs. Other industries that may also be using switchable privacy filters are kiosks, payment terminals, secure access systems, Mobile devices, and hardware authentication. In general, any device that requires PIN, TAN or password entering would be an ideal application for this technology, where great benefits may come up.

Technical Parameters:

In the very basic structure, the technology can be applied onto nearly any type of flat panel display ranging from LCD to OLED or other. The loss of brightness is just a fraction of less than about 10% and that is nearly unnoticeable by naked eye. During public mode, there will is full resolution with full color capability; the viewing angle is also not limited. When the privacy mode is activated, the viewing angle is automatically restricted, typically +/- 15 up to +/-30 DEG (adjustable to client needs during the hardware customization phase). The visible sweet spot can be calibrated by content and it can be displayed partially on screen or full-screen. The current version is passive filter and no energy is needed.

The technical parameters are summarized as below:

Applies to:	Applicable to nearly any type of flat panel display (LCD, OLED, other) of nearly any size up to 24 inch
Brightness Loss:	Less than 10%
Public Mode:	No Resolution loss, full colour
	No Angular Viewing Restriction
Privacy Mode:	Restricted Angular viewing
	(Typ. +/-15 up to +/-30 DEG or more, adjustable within certain

limits)

Visible Sweet Spot Position can be calibrated by content (e.g. by real time eye tracking of privacy sweet spot)

Privacy Mode can be full display area or partial area only

Note: Restricted Colour Space and Resolution in Privacy Mode

Active/Passive Type: Passive Filter - no energy needed

Thermic Range: test -40 DEG C up to +85 DEG C

For more information please contact us.

---

siOPTICA GmbH

Moritz-von-Rohr-Str. 1a

D-07745 Jena

Germany

Contact:

Tel: +49 (0) 3641 6345 902

Fax: +49 (0) 3641 6345 905

Email: info@sioptica.com

Web: www.sioptica.com

Copyright © 2014 by siOPTICA GmbH, Jena, Germany.