# SPD Control Systems Corporation (SCSC)

*Changing the way you view windows ®*

# Newsletter

**October 2012**

**Table of Contents**

## 1.  Japan Patent Awarded

The Japan Patent Office has granted the first of our two Japanese patents for an '**SPD control Apparatus with Scalable Networking Capabilities for Window and Multimedia Applications'**. This patent covers the design of wired and wireless networks of SPD controllers for applications ranging from automobiles, planes, ships, trains and other moving vehicles, to residential homes and to the smallest commercial buildings to the largest skyscrapers. In addition, it also covers the creation of SPD-based textual and graphic displays as well as certain basic operational structures to operate an SPD electronic controller.

SCSC now has 4 granted and 3 pending patents in the US, Europe (EU) and Japan.

Jay Moskowitz, the SCSC Founder and Chairman of the Board, states, "This patent awarded by the JPO reinforces our position as the SPD electronics supplier for all applications of the technology."

> **SCSC Patents**
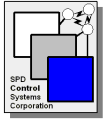
**2. Next Generation TintMaker Aftermarket Controller**

SCSC has released of our next generation aftermarket TintMaker® controller. The improvements include enhanced safety error detection and a reduction in electronic interference. The controller started shipping in August 2012. SPD SmartGlass aftermarket companies replace windows in automobiles, airplanes and yachts for the general public and commercial fleets.

Our flexible, highly configurable, customizable, feature-rich SPD electronic controller brings SPD windows to life. The TintMaker® individually controls up to 8 SPD windows using several different methods: manual dimmer/slider controls, automatic control from on-board systems, and self-regulated control via sensors.

> **TintMaker® Controller**

**3. TintMaker Electronic SPD Window Shades**

SCSC has introduced a new capability known as 'Electronic SPD Window Shades' in our latest version of the TintMaker controller firmware. It is now possible to have multiple levels of tinting within a single window. This is accomplished by laminating multiple segments of SPD film into the windows.

A user can now turn a single dial or move their finger along a single touch sensitive bar to control a multi-segmented window as if it was a window shade and bring down the tinting to various degrees from the top to the bottom as desired. For a window consisting of 4 distinct segments, the effect might look something like that shown in the Shade Simulator section of the following screen capture.
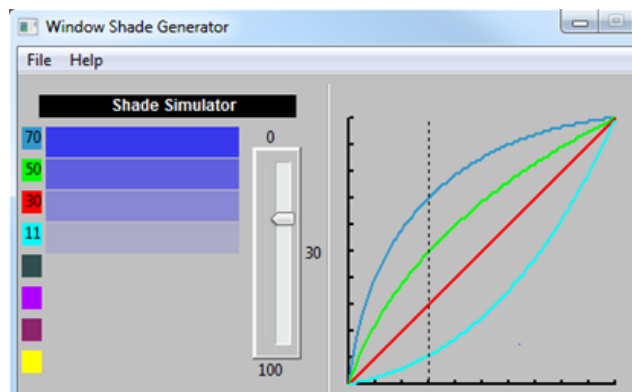


The image is from an offline Microsoft Windows based program that is used to create the exact manner in which each segment should be individually shaded in relation to other segments when the input dial is set to any level between 0% and 100% tinting. The information generated by this program is saved in the TintMaker and is used to control the actual window just as it has been simulated in this configuration program. This effect looks something like the first 25 seconds of the Corning Day Made of Glass Video at:

http://www.youtube.com/watch?v=6Cf7IL_eZ38
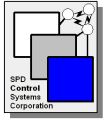
## 4. Distributed OEM Controller

For our automotive Original Equipment Manufacturers (OEM) customers, we have designed a very flexible very small footprint controller which can be co-located with SPD windows and are networked across the vehicle to other windows, control switches and sensors. This SPD controller network interfaces with other onboard automotive subsystems. Unlike our centralized aftermarket TintMaker 8-window controller, this design minimizes the distance that high voltage signals, used to control an SPD, moves between the controller and the SPD window.

There are two TintMaker OEM Controllers (TOC) in this architecture. The TOC-M (Master) is a control unit that drives TOC-S (Slave) units and interfaces to other on board systems over the vehicles CAN bus. The TOC-M also provides analog to digital converters for direct sensor input. The TOC-S (Slave) units are connected on a private LIN bus and contain the SPD drive logic to set the windows at any specific opacity as specified by the master. This is an architecture that is described in our US, European and Japan patents.

Up to 16 TOC-S's are activity controlled by the TOC-M. Each TOC-S directly controls one window from one output window connection. This output connection may also operate multiple SPD segments to be controlled as a single window. Tint levels are changed from an automobiles onboard computer system, switches, smartphones, and tablets. The controller will meet all OEM automotive specifications. The TOC-S units are similar in size to a cigarette box.

The TOC is based upon the firmware of our TintMaker automotive controller and its more sophisticated big brother, SCSC's architectural controller which has an integrated distributed wireless ZigBee network to operate tens to hundreds to thousands of individual windows.

We have designed an optional quadruple redundant SPD controller version of the TOC-S that is capable of operating critical SPD windows. Since SPD is normally dark in the unpowered state, this fail-safe architecture can insure that an SPD front windshield always remained clear when the vehicle is in motion yet turn dark to block heat when the vehicle is parked in the hot sun.

**SCSC employs NASA Rocket Scientists.** The engineering team at SCSC has developed many sophisticated fail-safe redundant telecommunications systems in the past. For this SPD redundancy design, SCSC augmented its engineering staff with additional engineers who were responsible for the fail-safe ground control launch subsystem for the NASA fleet of space shuttles. The failure of this ground control system would jeopardize the lives of the astronauts and the shuttle vehicle. These engineers developed control systems providing the highest degree of redundant operations.

## 5. BMW Active Tourer with SPD SmartGlass

BMW announced the Active Tourer vehicle at the 2012 Paris Motor Show. This concept car SPD windows are operated using an SCSC TintMaker controller. The BMW Press Release states,

> **Cool Shade" panorama roof: changes spatial feel and temperature at the press of a button.**
>
> An innovative panorama sunroof creates a unique ambience, extending across the entire roof surface of the BMW Concept Active Tourer. The composite glass roof with innovative Suspended Particle Device (SPD) technology means that the desired brightness or temperature effect can be created at the press of an electric button - either being darkened to the level of powerful sunglasses or raised to crystal clear brightness. Occupants can achieve a special lighting
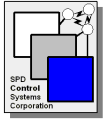
effect by manually adding a large-area leaf structure design to the glass roof. Electrical impulses cause the molecular structure of the glass to change at continuously varying levels between light and dark according to preference. The play of light and shadow thus created highlights the sense of space, thereby generating a pleasantly atmospheric lighting effect on all seats.

> **BMW Press Release**
> **Autoblog Article**
> **Video** (4 minutes)
> **Video** (30 seconds)

## 6. SCSC Awarded 2nd NYSERDA Contract

The New York State Energy Research and Development Authority (NYSERDA) awarded SCSC a contract for performing a marketing analysis for our SPD Building Energy Management Control System (BEMCS). This is our second NYSERDA contract for developing and commercializing our BEMCS architectural control products.

> **BEMCS Description**

## 7. SCSC Products

SCSC is focused on the design, development, production and support of SPD electronics and control systems for all environments as well as the licensing of our intellectual property (SPD electronics patent portfolio).

Our TintMaker(r) 8-window automotive aftermarket controller can operate each window independently of the others or in groups as desired. It allows up to 16 separate external devices to control the tinting of one or more windows. These may be push button switches, rotary, slide, and touch sensitive type dimmer switches, photo-sensors, occupancy sensors, and temperature sensors among others. TintMaker's have been installed in demo and test vehicles across a large number of automotive manufacturers and installed as an after-market controller in many different types of vehicles including cars, trucks and busses.

The Original Equipment Manufacturers (OEM) version of our controllers is described in section 4.

Our TintMaker architectural controllers are a variation of our automotive controller to operate multiple windows across a commercial buildings facade or across a residential home. The architectural controllers features a fully integrated self-configuring maintenance free wireless network over which every controller communicates with every other controller and all of the switches and sensors connected to any controller can operate any window or windows anywhere in the building.

The entire system is configured through a web browser connected to a Master Controller which then configures each controller over the wireless network. That Master Controller also operates all windows automatically throughout the building to minimize yearly energy costs, while allowing occupants to temporarily override these automatic settings. Seasonal glare control addresses problems that occur for a few hours a day for several months of the year. The Master Controller also monitors the entire network of controllers and provides statistical gathering capabilities to help optimize the performance and energy saving capabilities of the system.

SCSC also develops customized controllers to meet the specific requirements of our customers. All controllers are software intensive, flexible and expandable to add new functionality at any time.
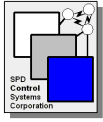
**SPD Control Systems Corporation**
Center for Wireless & Info. Tech.
Stony Brook Univ. R&D Park
1500 Stony Brook Road
Stony Brook, NY  11794-6040
631-776-8500 office
631-776-8501 fax