Founded in 2000, this manufacturer has produced innovative touch panel technology for customers around the world. A total solution provider of high performance, large-format multi-touch sensors and diverse controllers, the manufacturer specializes in small-to-medium volume batch production for products of all sizes. Its versatile sensor designs are used for single-touch and multi-touch applications in a wide range of industries, including casino gaming, medical, retail point of sale and digital signage.

This designer and manufacturer turned heads in the electronics manufacturing world by introducing its first 42-inch patterned sensor made with silver nanowire transparent conductive film. This innovation enabled full-scale production of the large-sized projected capacitive screens — which are now being deployed on a variety of large-sized gaming devices.

But for most of its history, the manufacturer had designed its products using Indium Tin Oxide (ITO) films. The company focuses on small- to medium-volume batch production and designs sensors used in both single- and multi-touch applications for casino gaming, industrial, medical, retail point of sale and digital signage.

The manufacturer had to look beyond ITO to make the leap to the next generation of larger-sized, lightweight devices with better optical properties that consumers want. ITO didn’t provide the low sheet resistance required for developing larger-sized devices.

The manufacturer’s customers are very sophisticated when it comes to gaming devices. Their requirements are based on their experiences with thin, light and highly reliable smartphones.

**CHALLENGE**

- To find a cost effective alternative to ITO, metal mesh and other AgNW films
- Meet performance criteria for low sheet resistance, high optical clarity for a large patterned touch sensor
- Compatibility with current laser etching manufacturing process

**SOLUTION**

- Trial of FLEXX silver nanowire-based Transparent Conductive Films
- Carestream FAE’s tested film to meet performance criteria
- Redesigned film and retuned laser firmware for existing manufacturing process

**RESULTS**

- No additional capital investment required
- Achieved optimal performance combination of low sheet resistance and high transmittance
- Mass production of touch modules for large gaming devices
The manufacturer started to evaluate FLEXX Films in 2013 because it was impressed with Carestream, and FLEXX Films offered the opportunity to achieve both low surface resistance and invisibility compared to metal mesh.

Silver Nanowire vs. Metal Mesh

As the manufacturer saw it, the company had two choices to go bigger and better. The first was metal mesh, which offered the sheet resistance it sought, but less than ideal optical clarity.

Or, the manufacturer could explore transparent conductive films based on silver nanowire technology. These films purportedly offered low sheet resistance and high optical clarity, often at a lower cost.

The manufacturer wanted a film that met all these criteria and was compatible with its existing manufacturing process — while meeting yield objectives. The manufacturer knew it would have to modify its laser etching process to make transparent conductive film, but it didn’t want to invest in new capital equipment.

The manufacturer had tried using silver nanowire-based transparent conductive films in the past, but didn’t achieve the results the company wanted. The other silver nanowire film it tried was difficult to handle and caused electrostatic discharge (ESD) damage.

Yet the manufacturer was willing to give silver nanowires another try, after meeting with representatives from Carestream Advanced Materials — the provider of FLEXX silver nanowire-based transparent conductive films.

The Strength of Carestream

Carestream Advanced Materials has deep expertise working with customers around the world. The company offers global reach, yet local support with research and development centers as well as manufacturing capabilities in Asia, Europe and the U.S. Also, Carestream’s field application engineers (FAEs) are available to provide continuous support during the design, integration and manufacturing phases of a project.

Carestream continuously works to improve FLEXX Films to meet the evolving needs of touch panel developers. This gave the manufacturer assurance it would have a partner for its current product development efforts as well as next-generation touch devices of the future.

The manufacturer started to evaluate FLEXX Films in 2013 because it was impressed with Carestream, and the films offered the opportunity to achieve both low surface resistance and good invisibility compared to metal mesh.

From Successful Trial to Finished Products

The manufacturer embarked on a trial of FLEXX Films, working closely with Carestream’s FAEs to make the silver nanowire technology compatible with its existing laser etching manufacturing process. Together, they conducted design of experiments (DOEs) for pattern invisibility and pattern isolation. Since the machine and transverse directions (MD/TD) ratio is much larger than ITO, Carestream worked to leverage FLEXX film technology to meet the manufacturer’s specific performance criteria.

Carestream provided expert engineering support. They re-designed the film to the manufacturer’s needs and re-tuned the firmware so there was no additional capital expense. Carestream made FLEXX Film work with the existing laser etching process.

As a result of the trial of FLEXX Films, the manufacturer was able to mass produce its 42-inch sensor made with silver nanowire transparent conductive film. Now, the company is planning to use FLEXX Films for another product development initiative.