



GENTEX
CORPORATION

Today's Features » Tomorrow's Technology

CAMERAS · DISPLAYS · ALERTS · TRANSCIEVERS · ELECTRONICS

Gentex Corporation

Gentex is a long-time supplier of electro-optical products for the global automotive industry. We supply nearly every major automaker with advanced electronic features that optimize driver vision and enhance driving safety. We also manufacture alarms and signaling devices for the commercial fire protection industry and electrochemically dimmable windows for the aerospace industry.

Since our inception, Gentex has managed the evolution of the rearview mirror. We've turned it into a strategic electronic module – a delivery mechanism for advanced vision-related features, including camera systems, displays and alerts.

Today, some of our core technologies are converging to yield products that provide unprecedented advances in rear vision and stand to become integral components in future mobility systems.



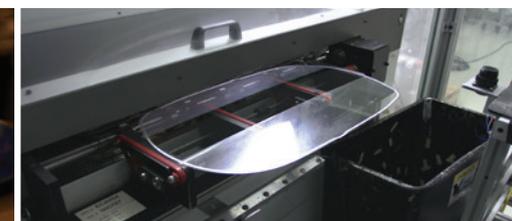
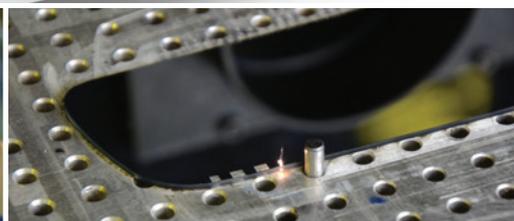
Why Gentex?

- ▶ World's leading supplier of electrochromic, automatic-dimming interior and exterior mirrors.
- ▶ High-volume, high-quality electronics manufacturer.
- ▶ Core competencies in microelectronics, vision systems, software design, chemical development, glass processing and coatings, microphones, automated assembly, and more.
- ▶ Expertise in automotive vision and rearward visibility products.
- ▶ 20+ years of experience in CMOS imager development and supply.
- ▶ Custom camera solutions and integration options.
- ▶ Trusted, long-time supplier of high-quality, innovative, priceable and OEM-tailored electronic features.
- ▶ Products for OEM integration, accessory programs and the automotive aftermarket.

Electrochromics

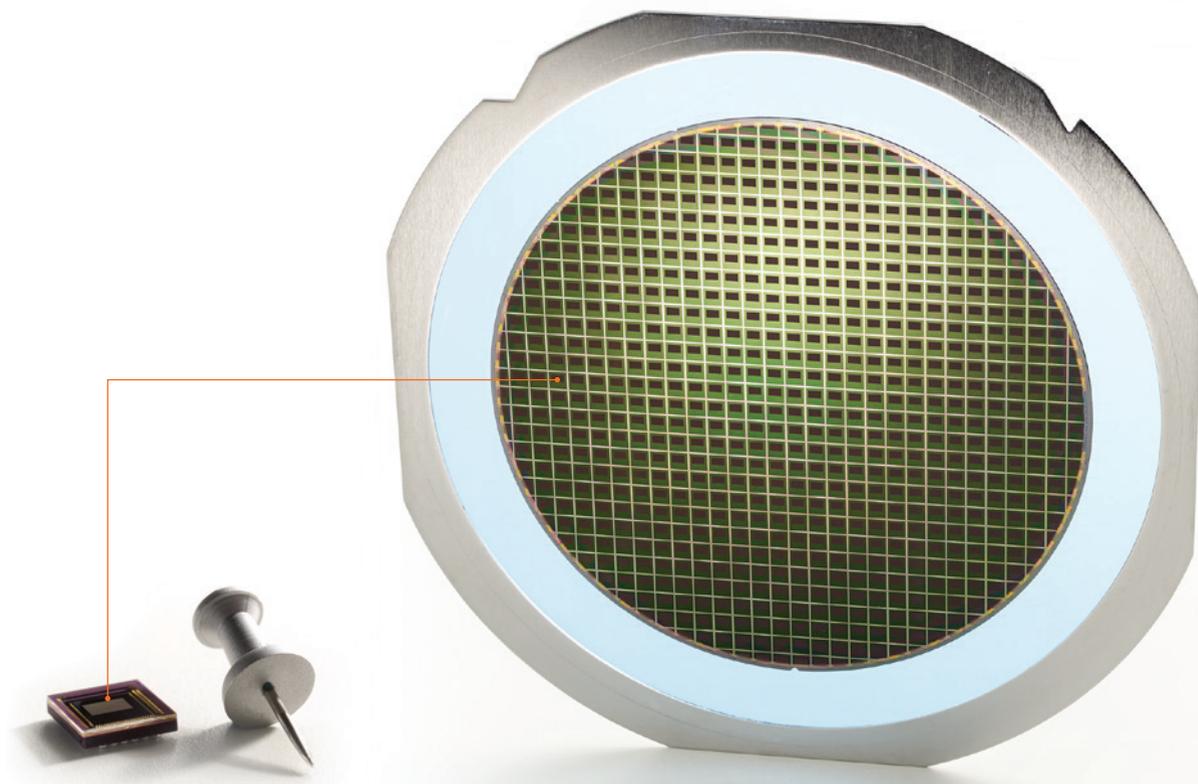


During nighttime driving, Gentex mirrors use sophisticated light sensors, proprietary gels, and microprocessor-based algorithms to detect mirror glare and automatically darken to the precise level necessary to preserve driver vision.



Vision Systems

Gentex understands the challenge of optimizing automotive vision. That's why we develop and manufacture our vision systems based on multiple imager platforms. We don't provide "black box" solutions; instead, we develop custom lighting-assist, driver-assist and rear-vision systems according to each OEM's unique specifications. From simple proprietary imagers for high-beam automation to sophisticated megapixel cameras for rear vision, Gentex can develop a custom imager solution designed for your unique applications, performance requirements and price point.



Custom Cameras for Machine Vision

SMARTBEAM®

SmartBeam was the world's first — and remains the industry's best-selling — automatic high-beam assist system. Today, SmartBeam's enhanced feature set provides unprecedented lighting- and driver-assist functionality in one compact, mirror-integrated module.



SMARTBEAM FUNCTIONALITY

- ▶ High-Beam Assist/Auto High Beam
- ▶ Dynamic Forward Lighting/Constant-On High Beam
- ▶ LED Matrix Beam
- ▶ Village Detection
- ▶ Motorway Detection
- ▶ Tunnel Detection
- ▶ Fog Detection

Custom Cameras for Automotive Video

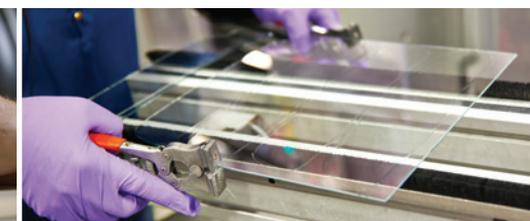
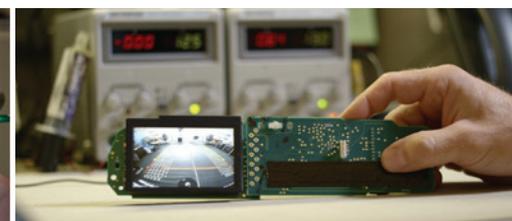
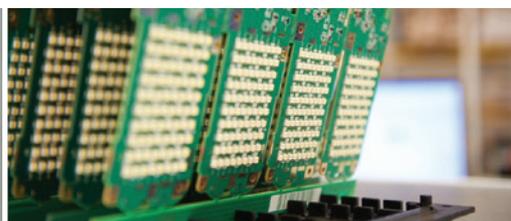
Gentex understands the challenge of optimizing rear vision. That is why we develop and manufacture our own imager systems tailored to support integrated features, performance requirements and OEM specifications. From basic imagers for standard rear vision systems to advanced megapixel cameras that support ADAS features and integrated graphics, we'll develop the imager system that's right for you.





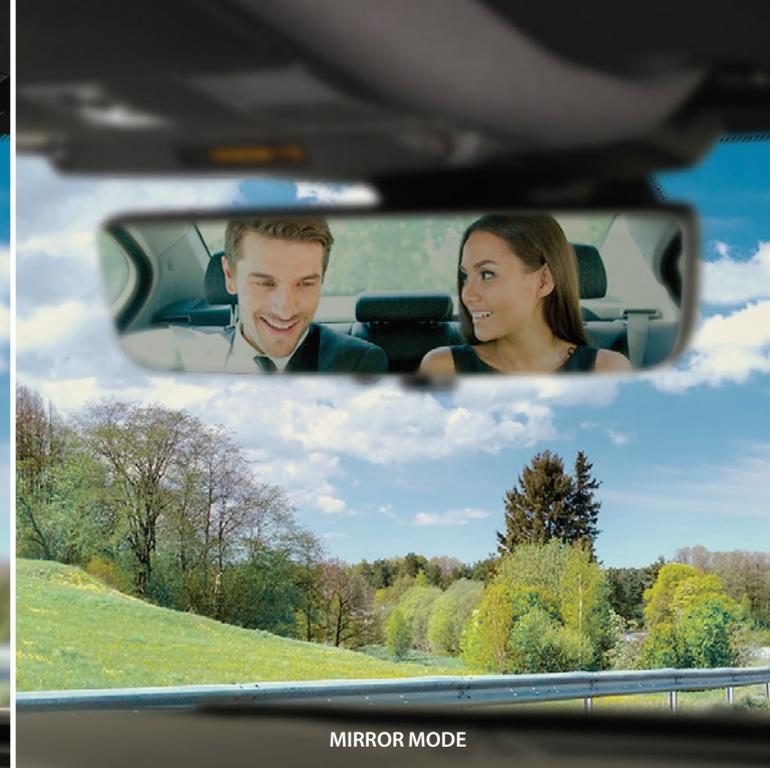
Displays and Alerts

The mirror is the original “heads up” display. It’s the most logical, intuitive and cost-effective location to display information critical to the driving task. Over the years, we’ve integrated a wide variety of displays in the mirror, including VFDs, LCDs, LEDs and active matrix video. Whether it’s compass, temperature, rear park assist, around view monitor, or rear camera display, Gentex can help you integrate it into the mirror.





DISPLAY MODE



MIRROR MODE

The Gentex Full Display Mirror® (FDM®)

The all-new Gentex Full Display Mirror optimizes visibility by providing an unobstructed, panoramic rearward view. It also affords unique yet critical bimodal functionality. It can operate either as a standard automatic-dimming rearview mirror or a rear video display.

WHY THE DUAL MODE?

- ▶ **OPTIMUM REAR VIEW** – display mode provides a radically improved rear view in order to enhance driving safety. Camera view is not hindered by headrests, luggage, C/D pillars, small rear window, etc.
- ▶ **FAILS SAFE** – mirror mode provides a permanent backup solution should camera or display become non-operational.
- ▶ **DRIVER PREFERENCE**
- ▶ **WEATHER CONDITIONS** – mirror mode may be necessary should camera become obstructed due to dirt, ice, or rain.
- ▶ **VIEWING THE VEHICLE INTERIOR** – mirror mode allows the driver to view vehicle interior, rear seats, passengers, etc.
- ▶ **GLARE ELIMINATION** – full auto-dimming function with mirror mode; interior mirror controls exterior dimming mirrors in either display or mirror mode.

Custom Integration of Complete Vision System

Gentex is your complete rear vision solution supplier. Imager, processor, software, display, camera lens and vehicle integration (shown right)... Gentex supplies it all as a complete integrated solution.



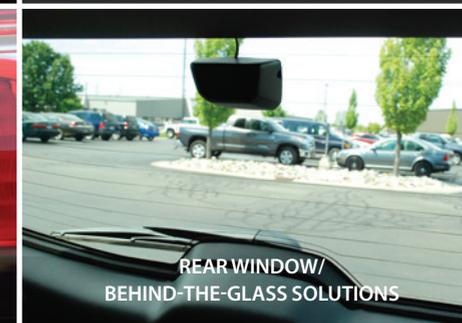
VEHICLE BODY INTEGRATION



SHARK FIN AND/OR GPS ANTENNA INTEGRATION



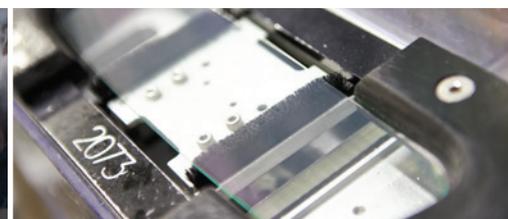
CHMSL DESIGNS



REAR WINDOW/ BEHIND-THE-GLASS SOLUTIONS

Rear Vision System Leader

No one has more rear vision experience than Gentex, which is why we're the leading supplier of intelligent rear vision systems for OEM racing programs, including Audi, Nissan Motorsports, Toyota Gazoo Racing, Cadillac, Porsche Motorsports LMP1, and others.





Biometrics

As connected car features grow, so does the need for cyber security. Automotive biometrics systems analyze physical characteristics (face, voice, fingerprints) to identify the driver prior to granting vehicle and/or information access.

Gentex biometrics consists of an iris-scan camera, near-infrared emitters, and system intelligence integrated into a rearview mirror assembly. It scans a driver's irides and maps their unique pattern to a storable, algorithmic-based template that authenticates the user with every subsequent glance to the mirror.

Theft Protection/Vehicle Operation

Authorized users could start the vehicle, with its operation modified for each different driver. In the case of an unauthorized driver, the vehicle could text its owner, limit functionality, or not operate.



Cabin Personalization

The biometric system could personalize the vehicle cabin according to user-determined presets for items such as:

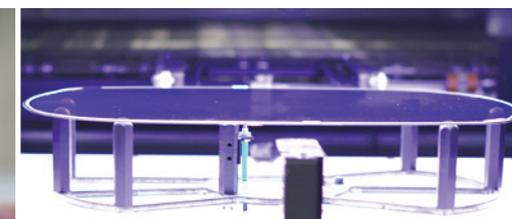
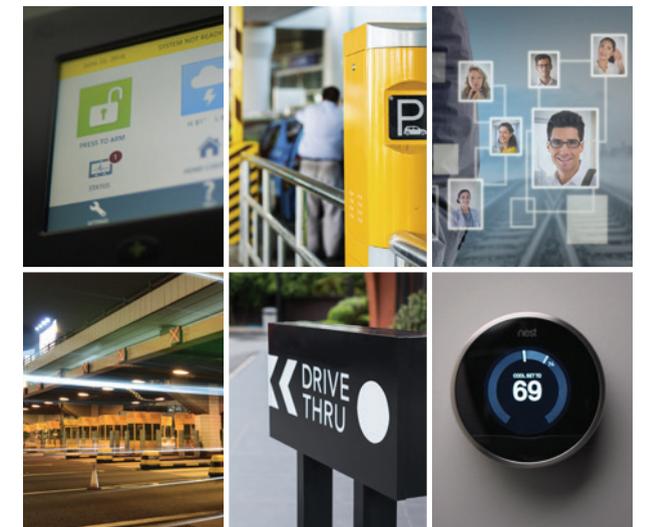
- ▶ Seat position
- ▶ Steering wheel position
- ▶ Mirror adjustments
- ▶ HVAC controls
- ▶ Music favorites
- ▶ GPS locations



Secure Access to Cloud-Based Services

The biometric system could also sanction safe, secure access to a host of cloud-based, connected-vehicle services, such as:

- ▶ HomeLink car-to-home automation controls
- ▶ Integrated Toll Module and parking payments
- ▶ Gas, coffee, fast food payments
- ▶ Ride/vehicle sharing accounts
- ▶ Social media accounts
- ▶ Online banking
- ▶ Work files and virtual meetings
- ▶ Health information





DYNAMIC SPOTTER



SPOTTER



SEGMENTED

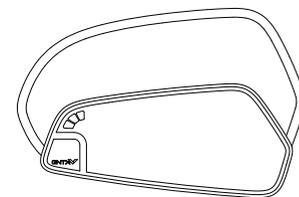


STITCHED

Camera Monitoring Systems (CMS)

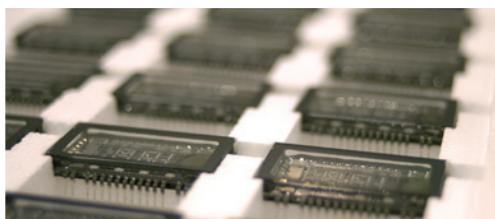
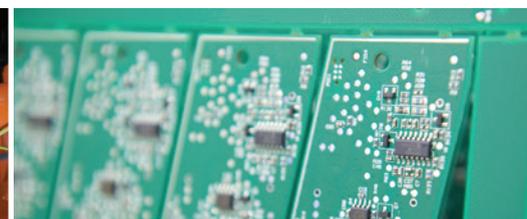
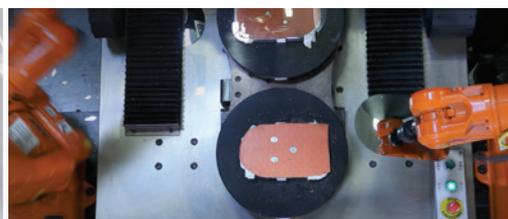
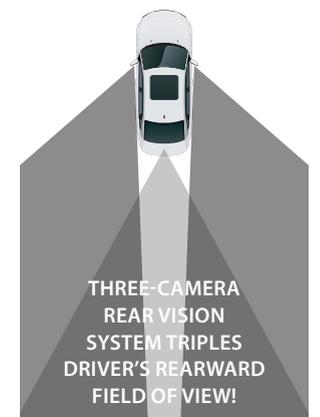
To blend the benefits of both mirrors and displays, Gentex offers a hybrid rear vision system that uses three cameras to provide a comprehensive view of the sides and rear of the vehicle.

The side-view cameras are discretely housed in downsized exterior mirrors, and their video feeds are combined with that of a roof-mounted camera and stitched together into multiple composite views that are streamed to the driver via Gentex's Full Display Mirror. The driver can choose between various viewing modes that present the three camera feeds independently or stitched together to form a single, wide-angle view.



System Benefits

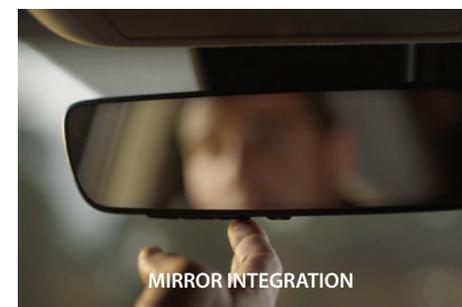
- ▶ **ENHANCED VISION** – provides unobstructed view of sides and rear of vehicle
- ▶ **FAILS SAFE** – mirror views available if digital view is disrupted
- ▶ **FUEL EFFICIENCY** – smaller exterior mirrors offer weight savings, improved aerodynamics and enhanced fuel efficiency
- ▶ **READY TO IMPLEMENT** – comprehensive system designed to meet automaker, driver, safety and regulatory requirements
- ▶ **COST EFFECTIVE** – no need to retool vehicle interiors to accommodate additional displays
- ▶ **ADAS INTEGRATION** – system can be integrated with side blind zone alerts and other ADAS functions





Multiple Integration Options

HomeLink has multiple integration options, making it easy to add to a wide variety of vehicles, from cars and SUVs to motorcycles and ATVs.



MIRROR INTEGRATION



VISOR & OVERHEAD CONSOLE SOLUTIONS

Mirror integration for easy, cost-effective cross-car-line application.

Vehicle integration for a sophisticated look.

HomeLink®

HomeLink by Gentex is a multi-button radio-frequency transmitter that can be programmed to control:

- 
 Garage door
openers
- 
 Security
gates
- 
 RF door locks
- 
 Interior/
exterior
lighting
- 
 Appliances

HomeLink V

HomeLink V is our most sophisticated version yet. We've improved package space, weight, programming ease, range, frequency, and accuracy. It's also a global solution, with a common module working in multiple markets. And, it's capable of providing two-way communication to the vehicle, allowing it to acknowledge the last known garage door open/close status.

Never again wonder if you closed the garage!



ACCESSORY MODULE

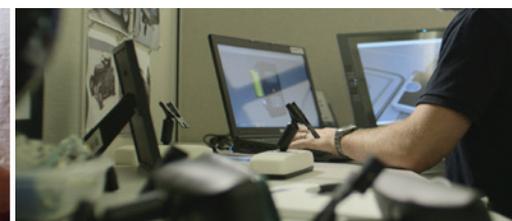
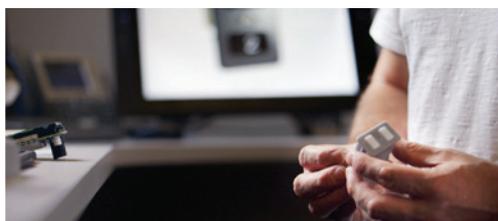
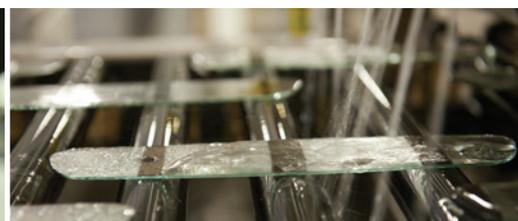
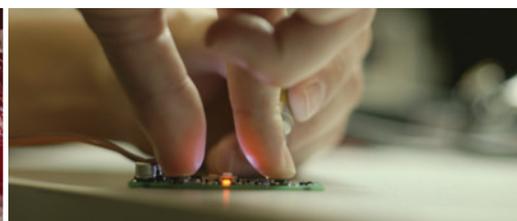
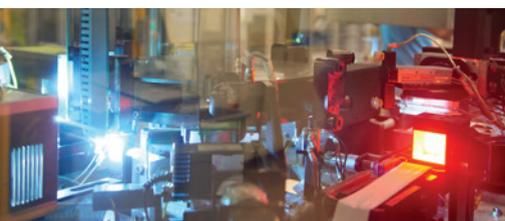
Small, sleek module available in a variety of colors to match vehicle interiors.

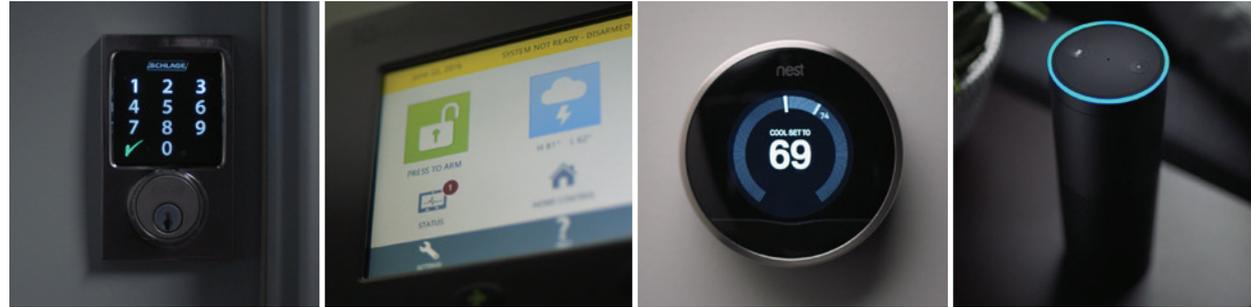


TWO-BUTTON UTILITY MODULE

For application on motorcycles, lawn tractors, snowmobiles, ATVs, etc.

HomeLink and the HomeLink house icon are registered trademarks of Gentex Corporation.





All-New Wireless HomeLink® with Companion App



Introducing HomeLink with next-generation functionality. HomeLink's vehicle-integrated buttons can now communicate through a mobile phone app via low-energy Bluetooth to operate home automation devices. The system is completely reprogrammable to control individual devices or entire scenes within the home automation eco system. This means you can interact with your smart home to control home lighting, door locks, alarm systems, and thermostats – all with a single button push. Automakers can even integrate HomeLink in their center stack using the HomeLink Connect app.



Integrated Toll Collection for the Connected Car

The Gentex Integrated Toll Module™ (ITM™) is a nationwide toll collection technology for factory integration into new vehicles. The system uses a mirror-integrated multi-protocol toll tag that provides motorists with access to any toll road throughout the U.S. The system allows automakers to offer yet another connected-car feature to their customers and benefit from an ideal, high-performance transponder location. Motorists benefit by convenient, unfettered access to the country's toll roads while eliminating toll-tag windscreen clutter and the need to manage multiple toll accounts.





Advanced Styling

At Gentex, we want to ensure that your mirrors are styled to not only showcase the technology they deploy, but also to reflect the beauty of their interior surroundings. Our new frameless designs allow for the seamless integration of technology yet highlight the beauty of the glass itself and the vehicle interior in which they reside.

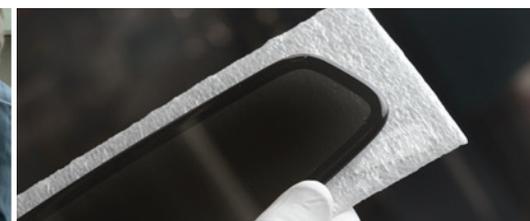
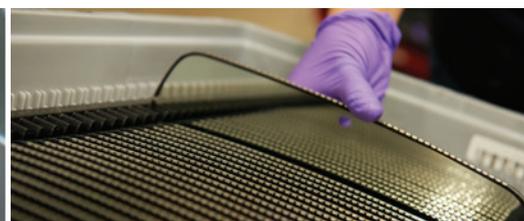
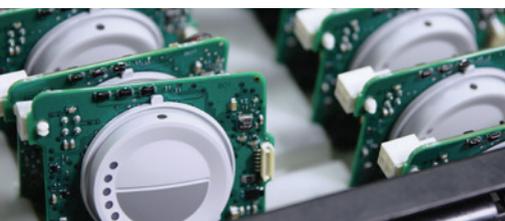


The Future

We're always thinking about the future. Our industrial design team is ready to work on a mirror design strategy that helps you differentiate by brand and model while setting you apart from the competition.

All-New Accessory Mirrors

We've recently integrated some of our best-selling features into one of our new frameless designs. They are the perfect addition to any OEM's accessory offering.





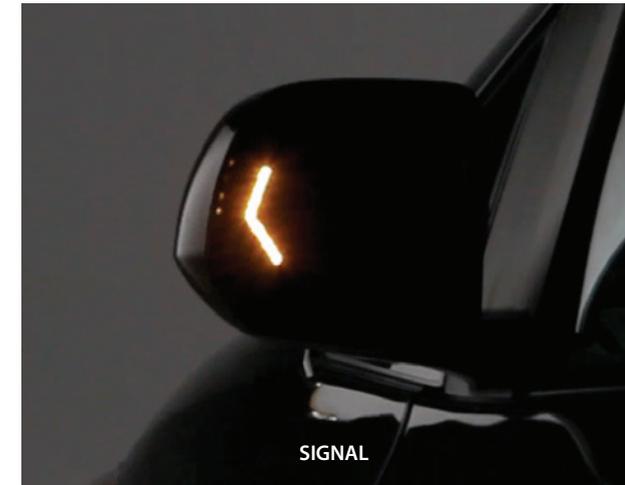
STANDARD EXTERIOR MIRROR



AUTOMATIC-DIMMING EXTERIOR MIRROR

Exterior Auto-Dimming Mirrors

The purpose of exterior mirrors is to help see what's along side you. That's why they are the perfect location for additional technologies that help eliminate the side blind zone. All of our exterior mirrors dim in tandem with the inside mirror and can contain custom lighting and electronic features that improve safety and visibility.



SIGNAL

High-powered auxiliary turn signals directed at drivers/vehicles in your blind spots that warn of impending turns and lane changes.



SIDE BLIND ZONE ALERT

The most efficient, intuitive and cost-effective location for side blind zone indicators.



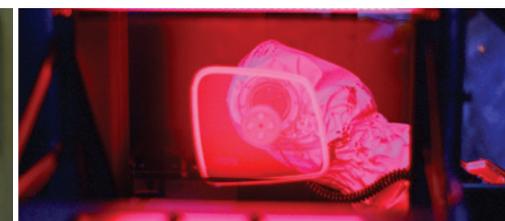
ASPHERIC (CURVED) GLASS

Curved mirrors that expand the field-of view, virtually eliminating the side blind zone and allowing for a dramatic reduction in overall mirror size.



APPROACH LIGHTING

High-powered, key-FOB-activated light that illuminates the door handle, side panels and entry path to the vehicle.





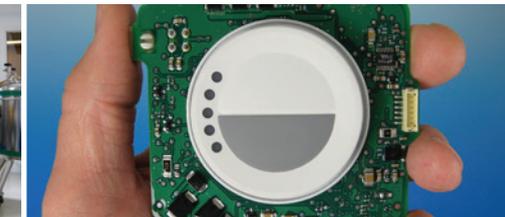
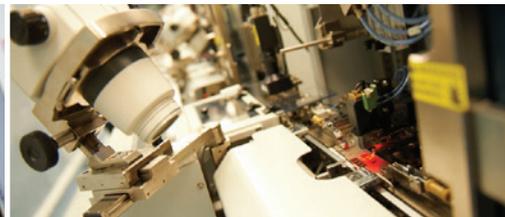
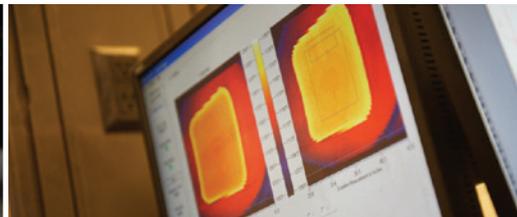
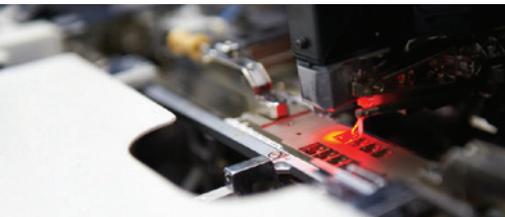
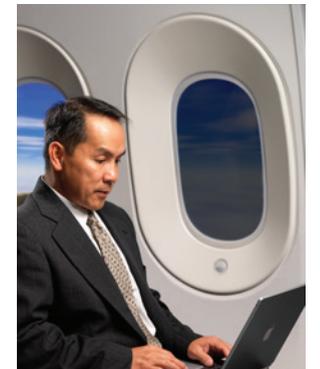
Fire Protection Devices

Gentex was originally founded as a manufacturer of high-quality fire-protection products. The market had long-recognized the need for better smoke detection, and in 1974, Gentex introduced the world's first dual-cell photoelectric smoke alarm. It quickly became the commercial industry benchmark because it is less prone to false alarms and designed to quickly detect slow, smoldering fires. This technology became the foundation for our current products, and today, millions of Gentex smoke detectors and signaling devices can be found in schools, dormitories, hotels and hospital buildings throughout North America and the world.



Airplane Windows

Gentex is the leading supplier of electrochemically dimmable windows for the aerospace industry. These windows darken on demand to cut sunlight and glare while still providing an exterior view. They make the flying experience better and more comfortable, improve aircraft design flexibility, and enable airlines to give their customers and crew more control over the view out of their windows.





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