

Sunlight Readable Touch Screen Solutions

PANJIT
TOUCH SCREENS

Your World View in a Touch



Sunlight Readable Touch Screens

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The Challenges:

- Overcoming Direct Sunlight Conditions
- LCD-Backlight Power vs. Ambient Light Conditions
- Reflection of Surface Light vs. Emitted Light of LCD
- Control of Light and Reflection Conditions

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The Target:

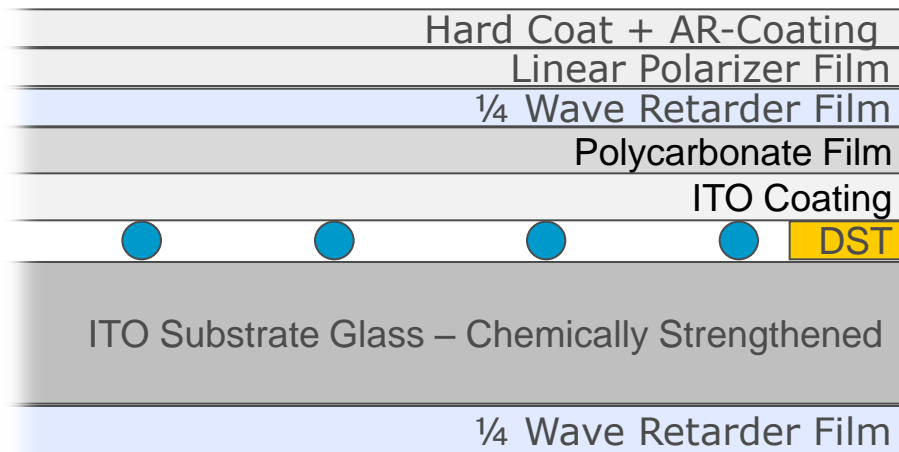
- True Readability in Direct Sunlight
- Reducing Reflections to a High Degree
- Economic Backlight operation of LCD
- Low Power Consumption
- Increased Life Time
- Cost Efficiency

Sunlight Readable Touch Screens



The Solution:

- Touch Screen Enhancements: EclipsTouch



- Hard coated surface + AR Coating
- Linear Polarizer + 1/4 Wave Retarder = Circular Polarizer
- 1/4 Wave Retarder Film
- Polycarbonate for enhanced optical performance for Sunlight Readability
- Conductive ITO Coating on PC Film
- DST, Air Gap and Spacer Dots
- ITO Substrate Glass (0.7 – 2.8mm) Chemically Strengthened
- 1/4 Wave Retarder Film

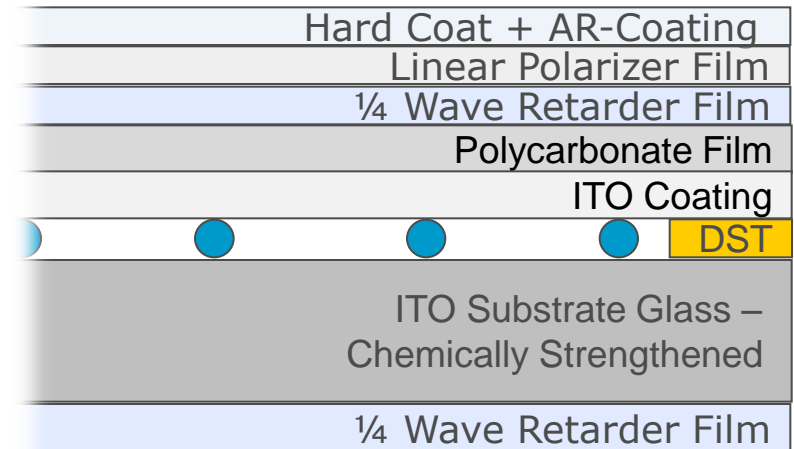
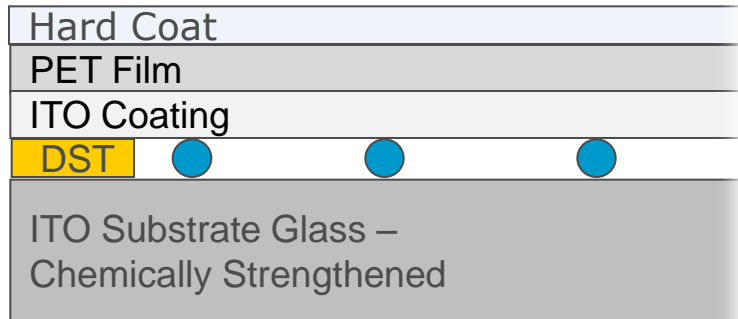
Note: Sunlight readable solutions include the AR. Additional AG treatment is optional

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Std. Resistive vs. EclipsTouch:

- Stack-up Structure



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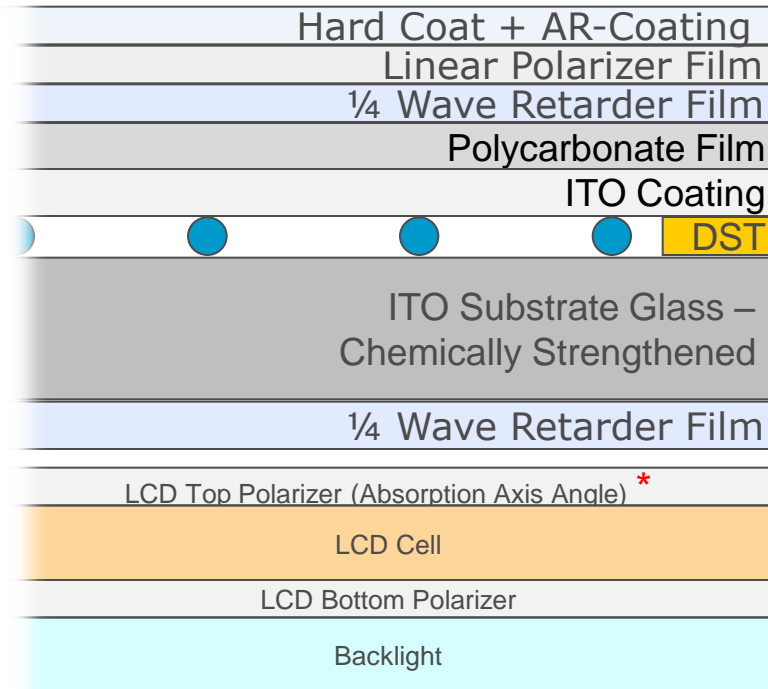
Std. Resistive vs. EclipsTouch:

- Comparison of Sunlight Readability



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EclipsTouch + LCD

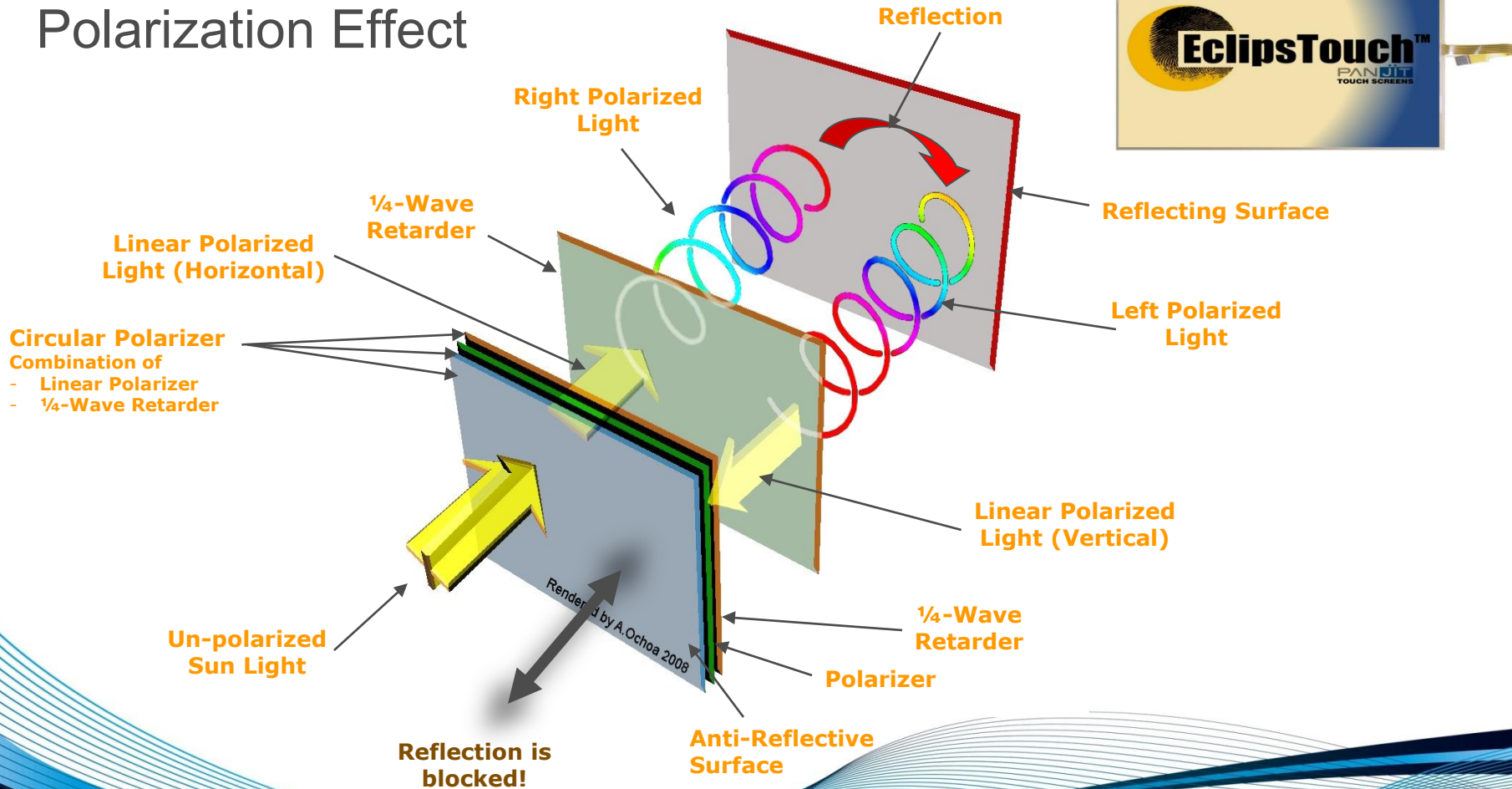


Gasket Bonding
or
Optical Bonding

* Circular Polarizer and LCD Top Polarizer have to be matched (!) for optical performance. Most common LCD Top Polarizer angles are 0°, 45°, or 135°.

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Polarization Effect



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Design Considerations:

- **Increasing Backlight (Inverters or high-bright LEDs):**
Improves readability in direct sunlight – but does not eliminate the reflection problems. Also increasing the Backlight has negative impact on Power Consumption, Heat and Product Life-Time.
- **Active Enhancements:**
Can increase the Display Luminance (Brightness) by factor 6 or more.
- **Optical Bonding:**
Eliminates the Air Gap between LCD and Touch Screen.
The Reduction of Reflection and the effective contrast Ratio will increase by 35 - 65%.
Cost intensive, non-reversible process (Exceptions), Best visual performance
- **Gasket Bonding:**
Cost-effective solution, reversible process, additional reflection (Air gap)

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Characteristics:

Item	From	To
Size	3.5"	19"
Substrate Glass Thickness	0.7mm, 1,1mm, 1.8mm	2.8mm
Surface Treatments	Clear + AR	Anti-Glare + AR
Haze	3%	15%
Transmission Rate	76% (GFG)	77% (FG)
Reflection Rate	1.3%	3%
Activation Force	40gr	150gr (Palm rejection)
Hitting Life	1 Million	5 Million
Temperature Range	Operation: -30°C - +70°C	Storage: -30°C - +80°C
Relative Humidity	20% RH	90% RH

Andreas Raabe
Sales Manager EMEA



Office + 49 89 829 523 06
Mobile + 49 176 701 951 87
Fax + 49 321 234 448 25
Andreas.Raabe@panjit.com
www.panjittouchscreens.com

Olschewskibogen 18
80935 Munich
Germany

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