



Projected Capacitance Touch Panel Technology

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Booth 1731



Outline

- Introducing Orient Display
- Capacitance Touch Basics
- Optical Bonding Expert
- Features of Orient Display CTP
- Ultra Thin OGS

About Orient Display

Evolution of Manufacturing Plants: Shantou, Guangdong



1991 Plant I



2004 Plant II



2010 CTP Sensor Factory

Company Vision

To become the most competitive manufacturer in the world for small & mid-size displays and touch panels.



2014 New Plant III

Parent Company

1957: Shantou Goworld Electronics (Group) Corporation was founded

1997: Guangdong Goworld Co., Ltd. listed on Shenzhen Stock Exchange

000823

High Tech Production Equipment



CTP-Sensor 线



LCD-液晶面板线



CTP-玻璃雕刻线



LCM-COG/FOG线



CTP/LCM-SMT 线



CTP-贴合线



CTP/LCM 全贴合线



环境实验室

Touch is Everywhere...

Coffee Machine

Model: GWTC11907
LCM Size: 10.4 inch



POS Terminal

Model: GWMD10908
LCM Size: 8.0 inch



Smart Phone

Model: GWMD11197
LCM Size: 4.7 inch



Play Station

Model: GWMD12028
LCM Size: 5.0 inch



Building Controller

Model: GWMD12097
LCM Size: 3.5 inch



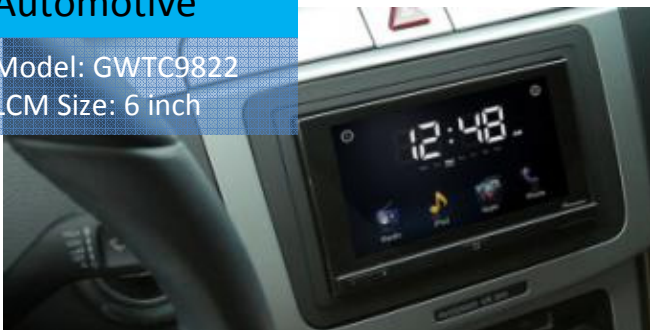
Tablet PC

Model: GWTC10148
LCM Size: 7 inch



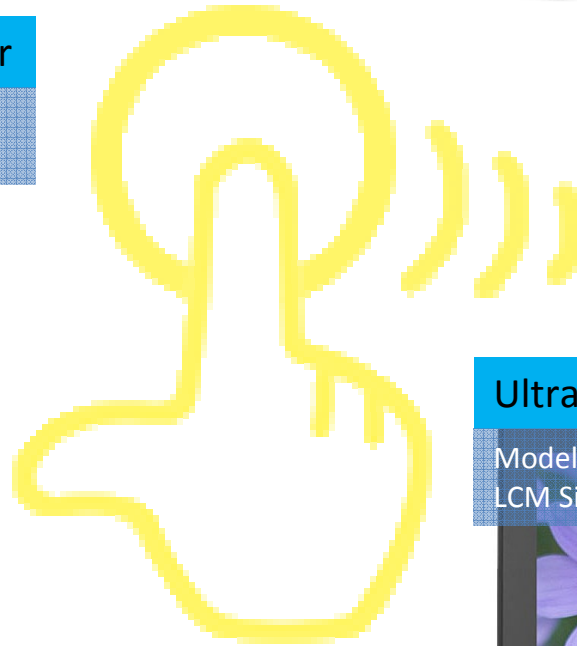
Automotive

Model: GWTC9822
LCM Size: 6 inch



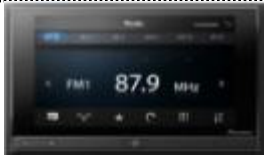







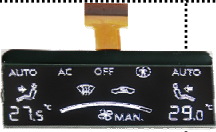

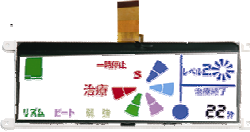
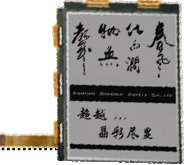







Ultrabook

Model: GWTC10930
LCM Size: 11.6 inch



Orient Display Product Matrix of Applications

Application Product	Appliance	Industrial & Medical	Automotive	Consumer	Smartphone
CTP Sensor/Module		 <small>Fig. 1: Resistive touch screens offer High reliability and durability, high accuracy, multiple input modes such as finger or stylus, high transmittance (>90%), and wide operating temperature range.</small>			
TFT Module		—	—		
VA (GDV) LCD/Module		—	 	—	—
FS (GDF) LCD/Module		—	—		—
Bi-Stable (ZBD) LCD	—	—	—		—
TN/STN LCD/Module		 			—

Orient Display Customers Include:

Appliance

The Miele logo consists of the word "Miele" in a white, bold, sans-serif font, centered within a red rectangular background.The LA Cimbali logo features the word "LA Cimbali" in a white, serif font, with "LA" in a smaller size and "Cimbali" in a larger size, all set against a red rectangular background.The BSH logo displays the letters "B/S/H/" in a white, bold, sans-serif font, with each letter separated by a vertical line, all contained within an orange rectangular background.The Samsung logo shows the word "SAMSUNG" in a white, bold, sans-serif font, centered within a blue oval shape.

Industrial & Medical

The Bosch logo includes a circular emblem with a stylized "H" on the left, followed by the word "BOSCH" in a bold, red, sans-serif font, and the tagline "Technik fürs Leben" in a smaller, black, sans-serif font below it.The Honeywell logo features the word "Honeywell" in a red, serif font.The EXOR logo displays the word "EXOR" in a white, serif font, with a diagonal line separating the "X" from the "O", all set against a dark blue rectangular background.The Siemens logo shows the word "SIEMENS" in a bold, teal, sans-serif font.The Westcontrol logo features a green checkmark icon on the left, followed by the word "WESTCONTROL" in a green, sans-serif font, all within a dark green rectangular background.

Office Equip

The Panasonic logo consists of the word "Panasonic" in a bold, blue, sans-serif font, with the tagline "ideas for life" in a smaller, grey, sans-serif font below it.The Canon logo displays the word "Canon" in a red, serif font.This block contains two logos: the HP logo (a blue circle with "hp" in white) and the Intel logo (the word "intel" in a blue, sans-serif font with a circular swoosh above it, and the Chinese characters "英特尔" to its right).The Vtech logo features the word "vtech" in a bold, blue, sans-serif font.The Leap Frog logo shows the words "Leap Frog" in a green, sans-serif font, with "Leap" above "Frog", all enclosed within a green circular border.

Orient Display Customers Include:

Automotive



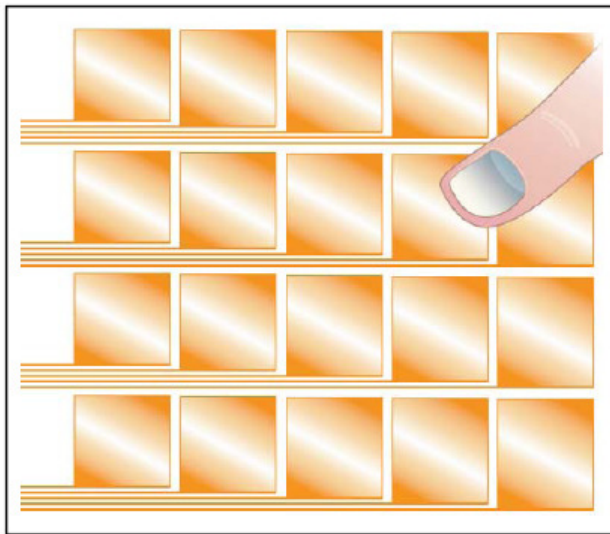
Data Terminal



Cell Phone

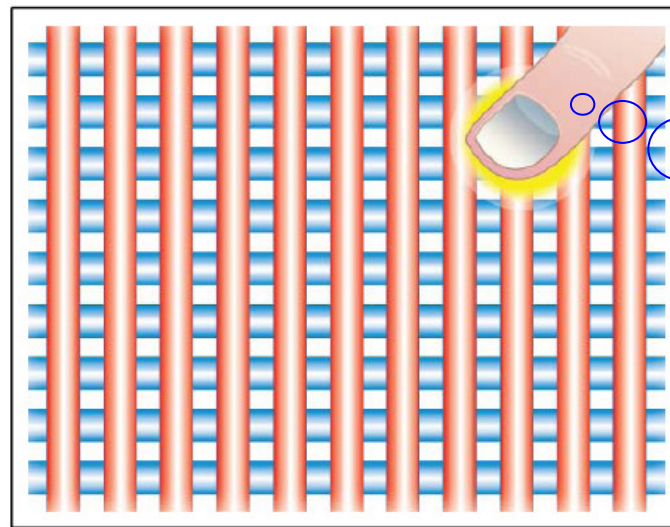


Self Capacitance: Two Types



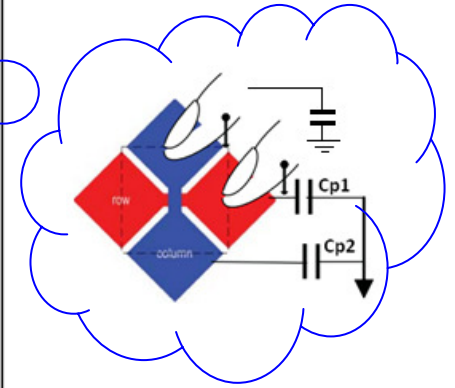
Single Layer

- Multiple separate touch pads arranged in a **single** layer.
- Each pad is scanned **individually**.



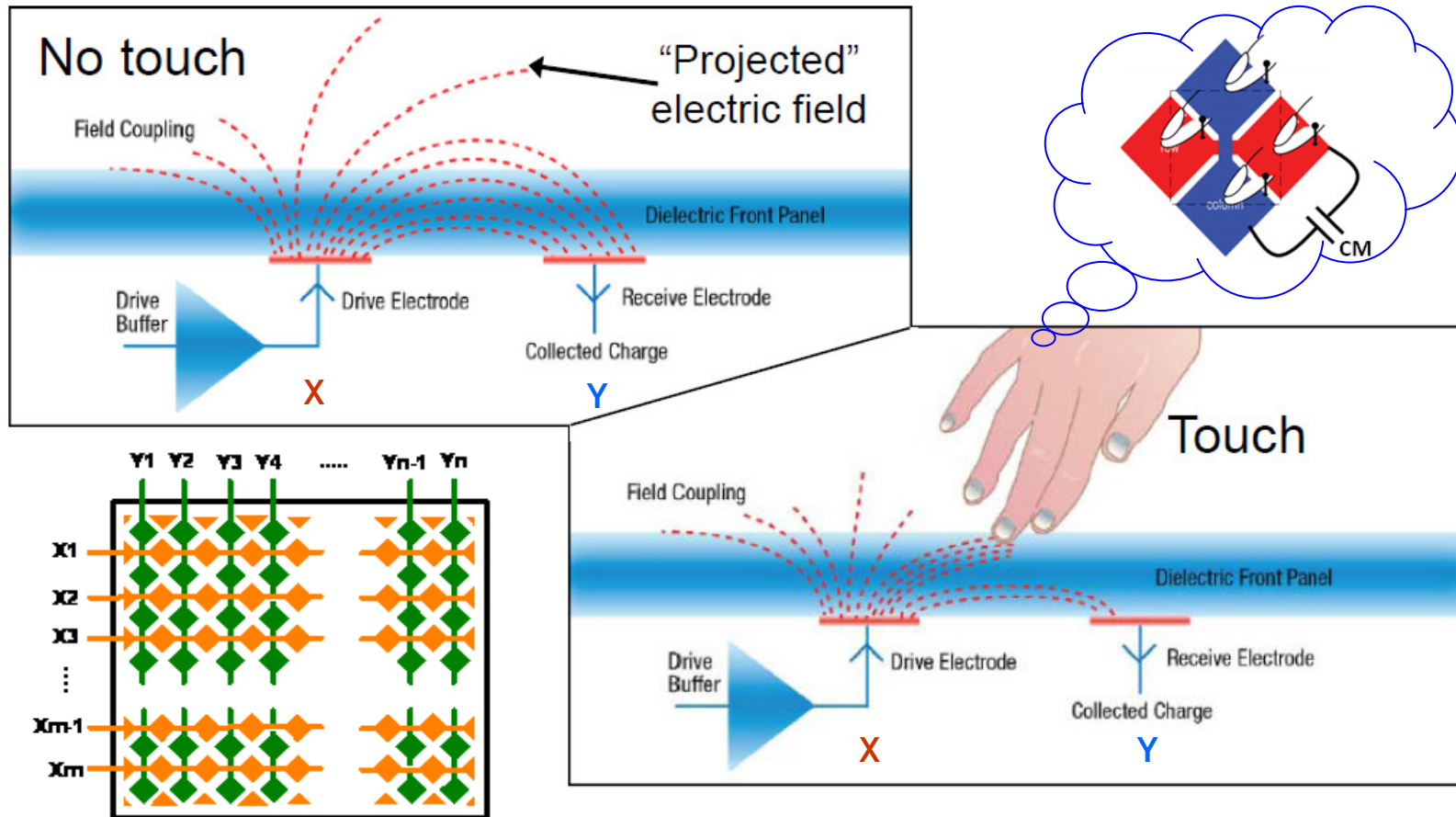
Two Layer

- Rows and columns of electrodes arranged in **two** layers.
- Each electrode is scanned **in sequence**.



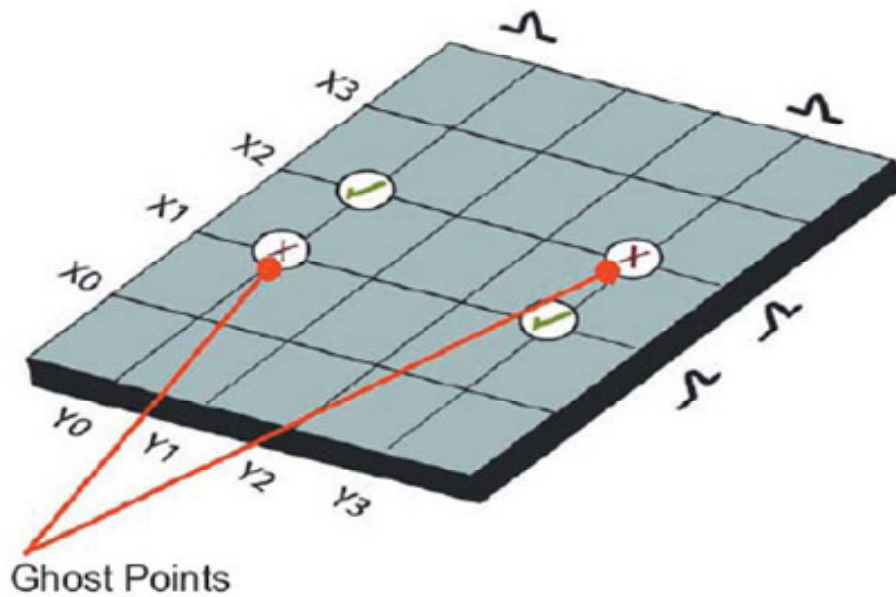
Low cost, but cannot support multi-touch or gestures;
Low noise immunity

Mutual Capacitance Principle



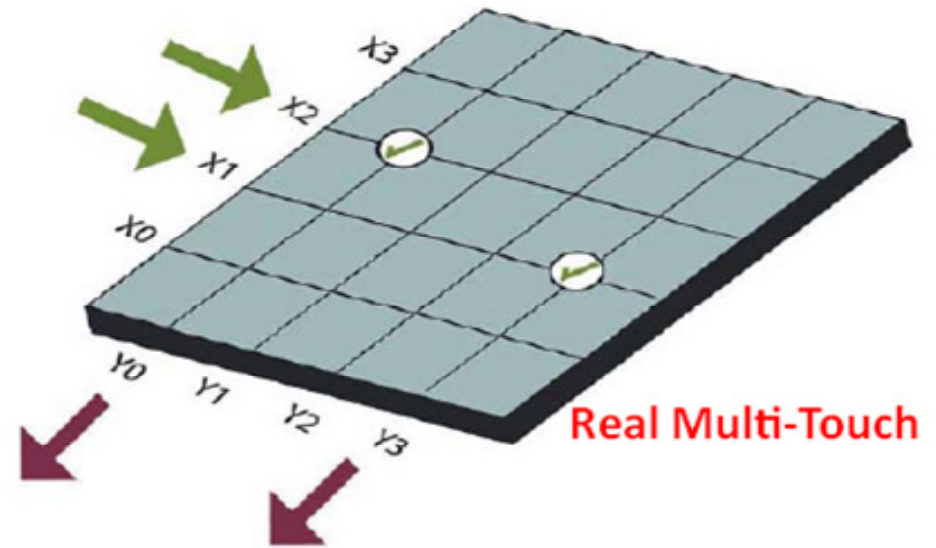
The change in capacitance at the point of **intersection** between X and Y is detected

Self Capacitance vs. Mutual Capacitance



Self Capacitance:

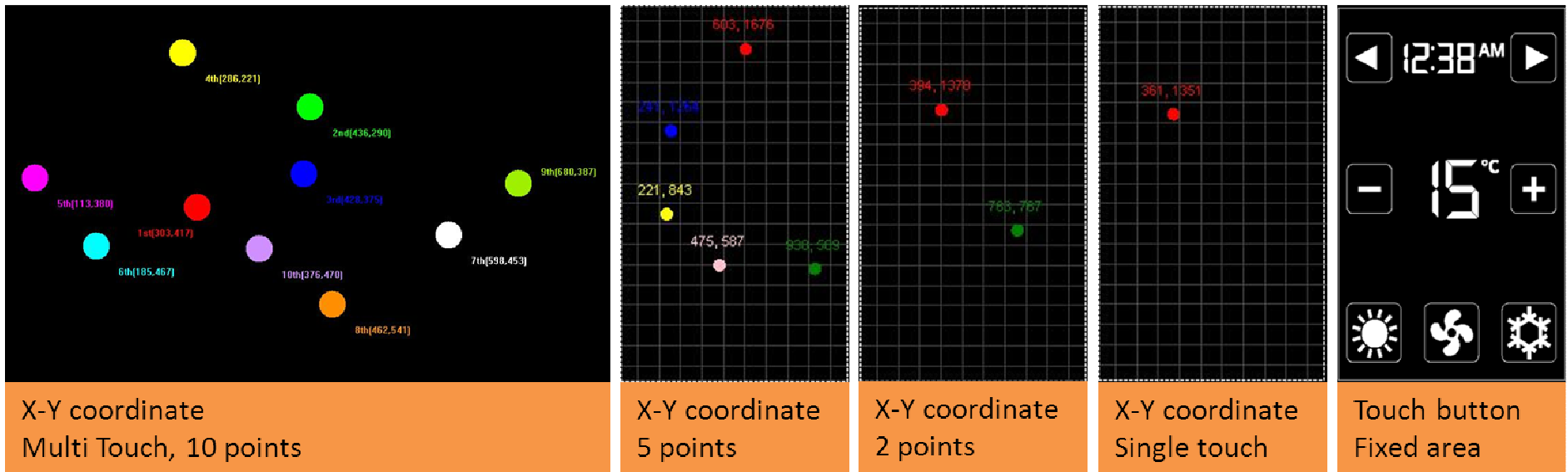
- Simple construction
- Low cost
- Limited to 1 or 2 touches
- Ghosting is a problem
- Lower immunity to noise



Mutual Capacitance:

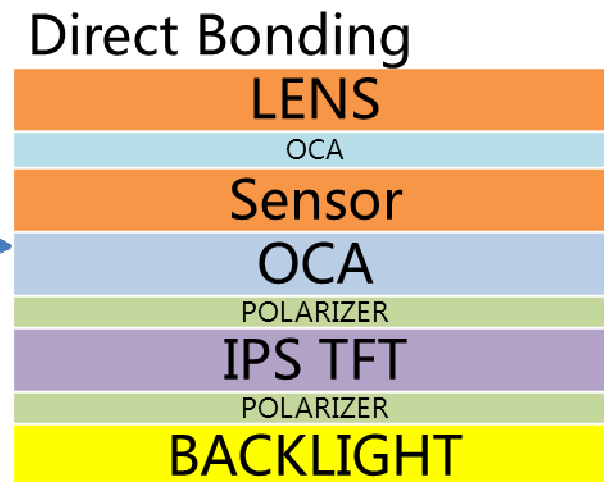
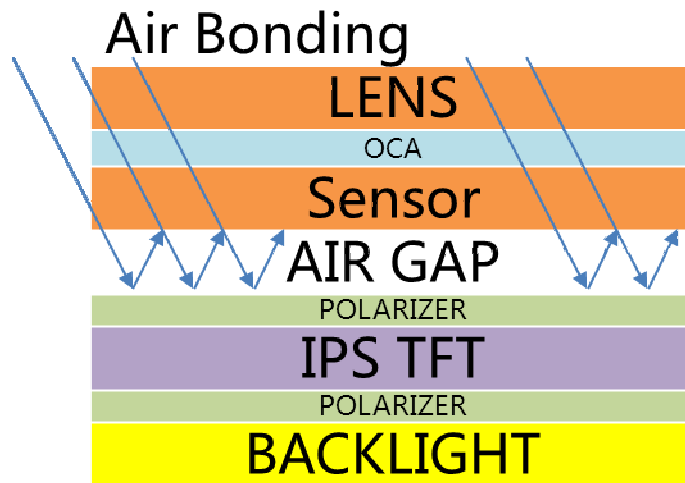
- More complex
- Higher cost
- Up to 16 touches
- No Ghosting
- Higher Immunity to noise

Mutual Capacitance (P-CAP) Touch Offers:



- Mutual capacitance can support multiple touches from 1 point (fixed button) up to 16 points.
- Projected capacitance also supports gestures: swipe, pinch, stretch, rotate, tap, double tap, flick, drag, etc.

Optical Bonding



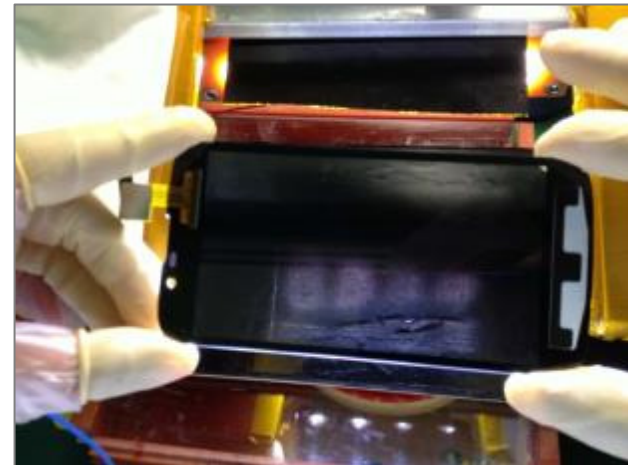
Better optical performance:

- Improved sunlight readability in outdoor use;
 - Improved transmission, contrast, and brightness;
 - Power saving without backlight modification;
- No moisture condensation or debris;
Ruggedize LCD; Improved mechanical performance.

Optical Bonding Machine

Robot transports CTP & TFT LCD into vacuum chamber.

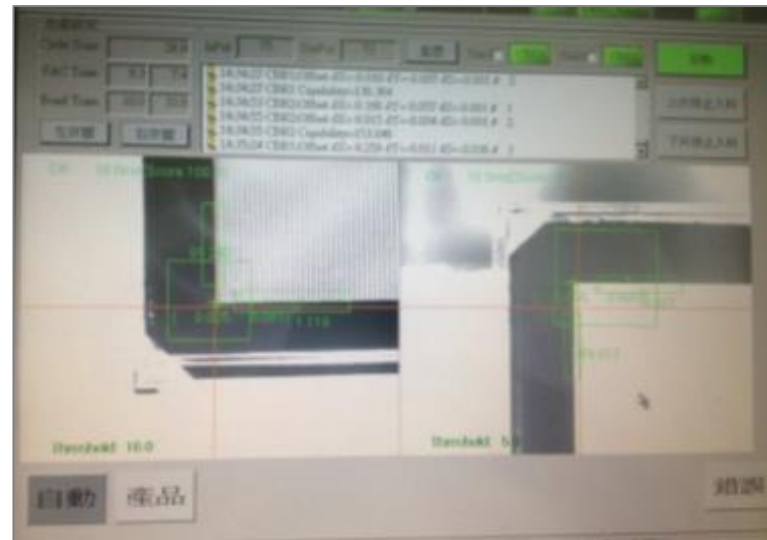
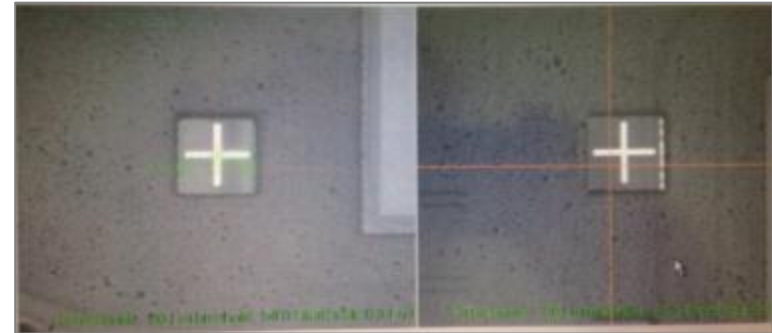
Improves manufacturing efficiency



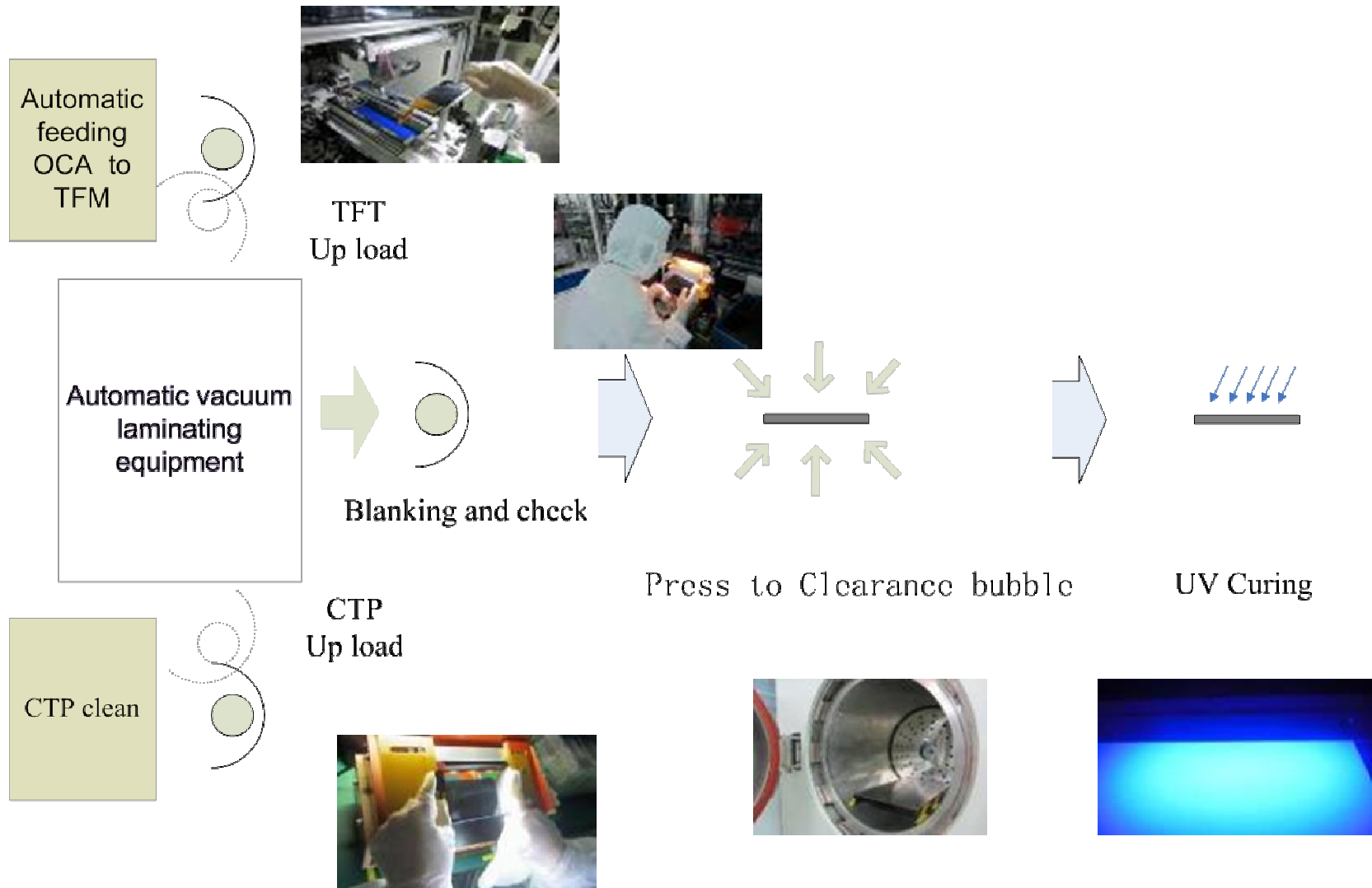
CCD Automatic Positioning System

4 Axis positioning: X, Y, Z, θ

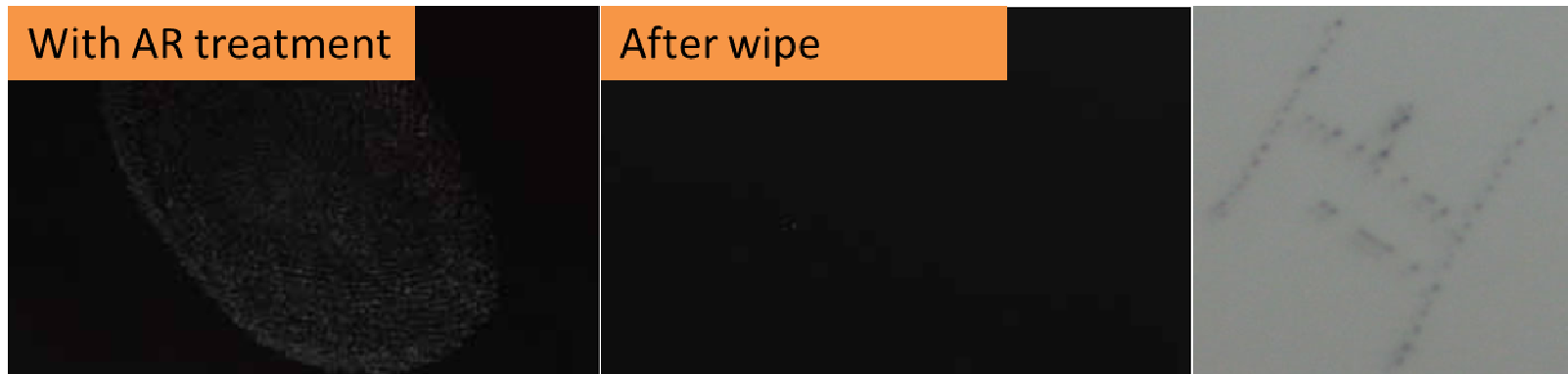
Auto position before lamination



Optical Bonding Process Flow

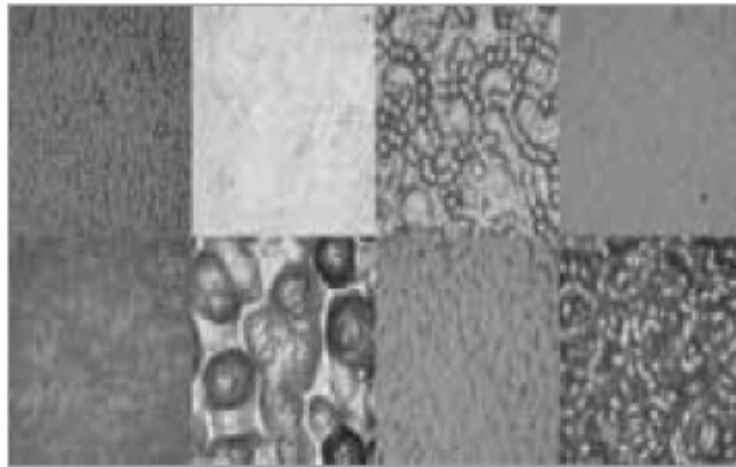


Anti-Fingerprint Coating

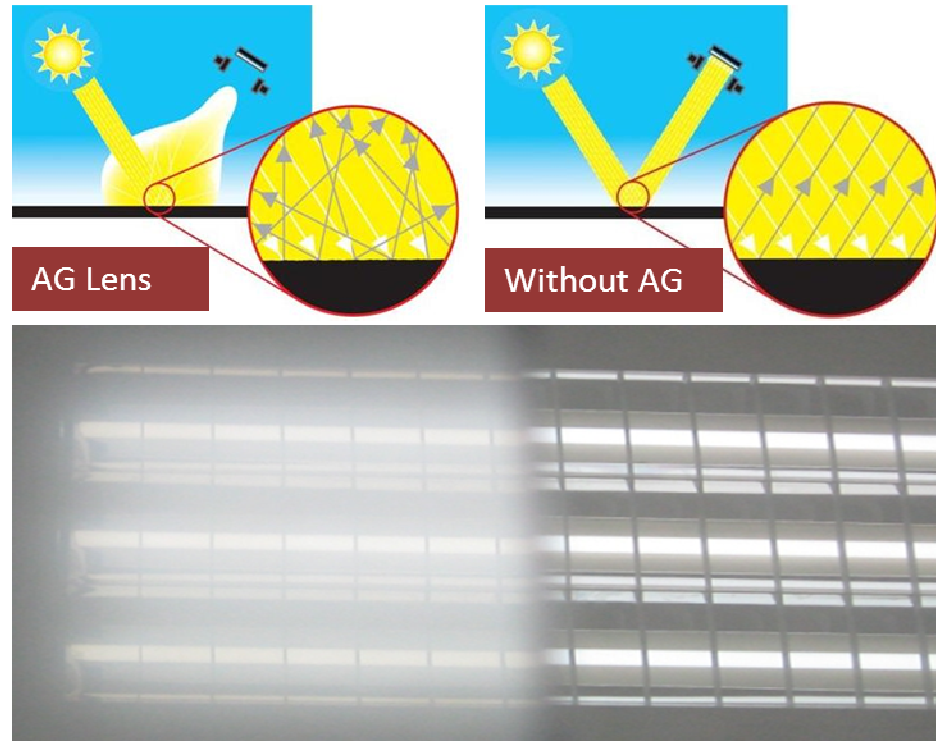


- Special chemical coating to repel water and oil
- Provides ultra-slippery glass surface
- Improves touch screen operability

Anti Glare Cover Lens: Etch, not Film

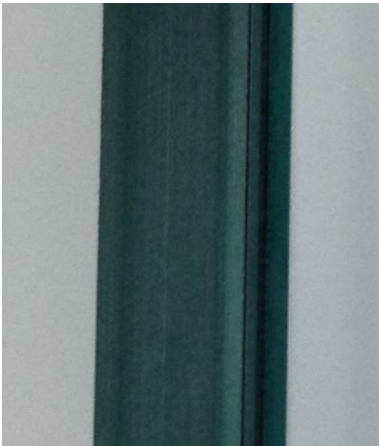


Different types of surface structuring leading to different optical and touch properties (Source: Berliner Glas)



Anti Glare is achieved in the touch panel by etching the glass lens. This significantly reduces glare in high ambient lighting and bright sunlight.

Anti-Impact Cover Lens



- Protection against external mechanical impact
- 5mm cover glass after chemical strengthening
- Impact energy up to 10 Joule
- Impact from steel hammer of 5 kg

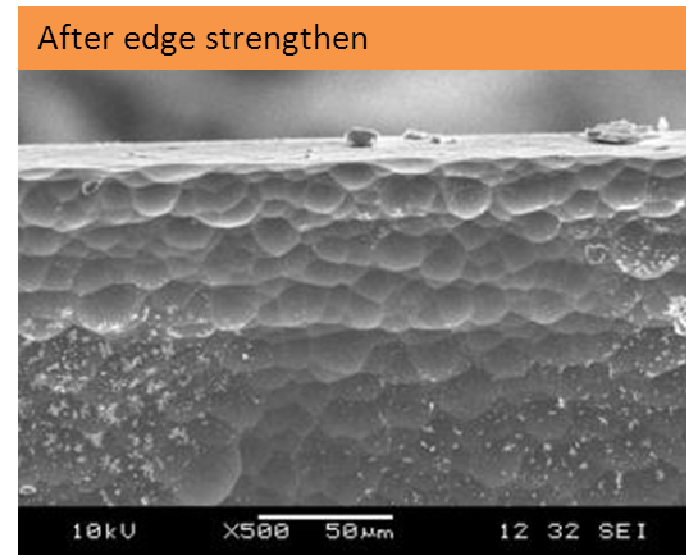
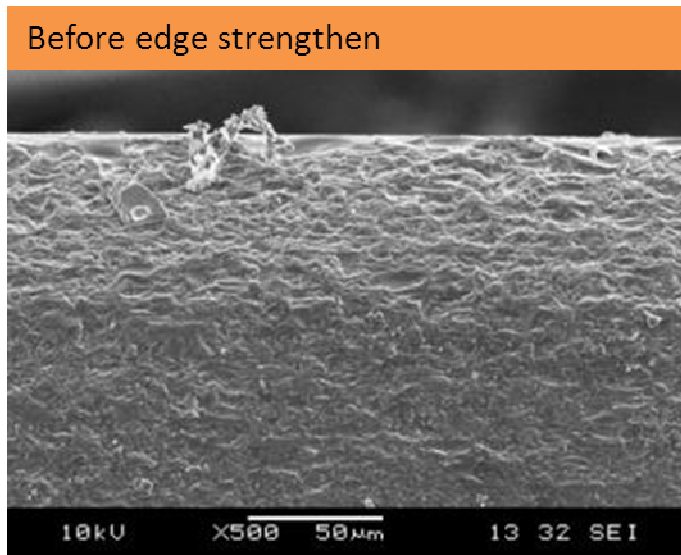
5mm thickness LENS

Orient Display Process = Safe & Green

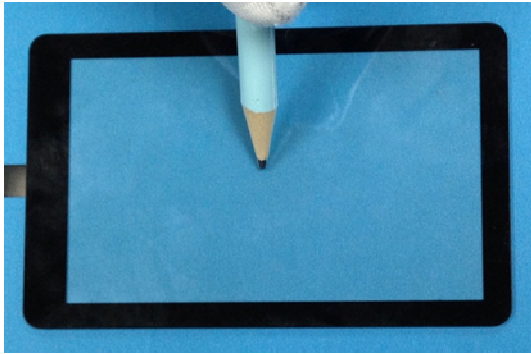
Strengthen glass sheet before cutting;

Avoids HF Etch process (toxic to environment);

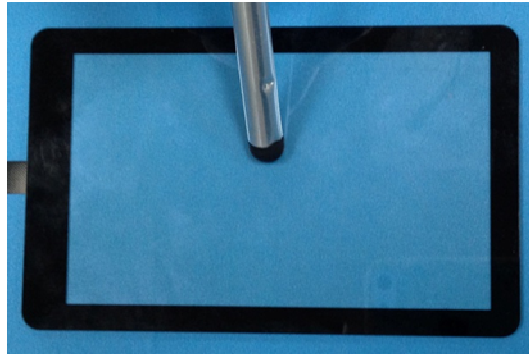
Result: Higher Compressive Stress (CS): 4PB strength > 700MPa



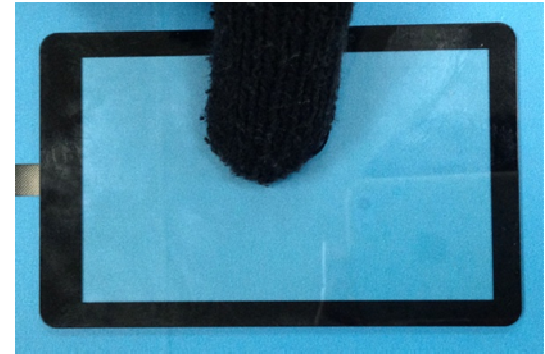
Multi Touch with Finger, Pen, & Gloves



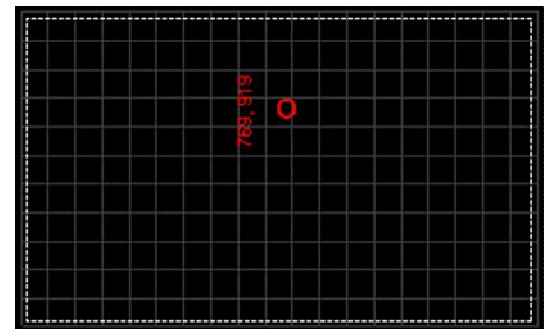
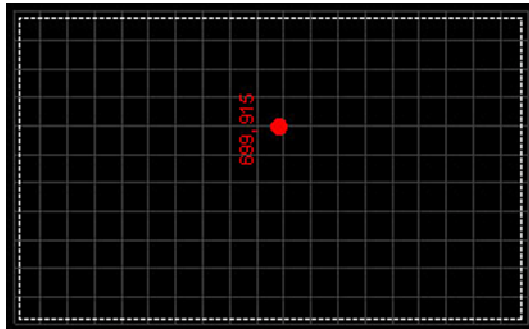
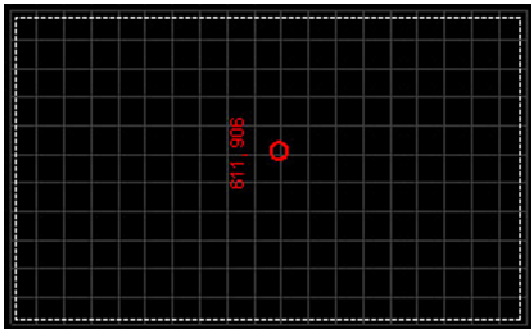
2mm diameter pencil



7mm diameter rubber



5mm thickness gloves



Automatic recognition of passive pen/glove/finger

Support pen diameter = 2mm minimum

Gloves up to 5mm thickness

Minimize Borders with White OGS

White OGS permits narrow border with photolithographic exposure process instead of printing; results in higher productivity & lower cost.



IMITO = Index Matched ITO



Before



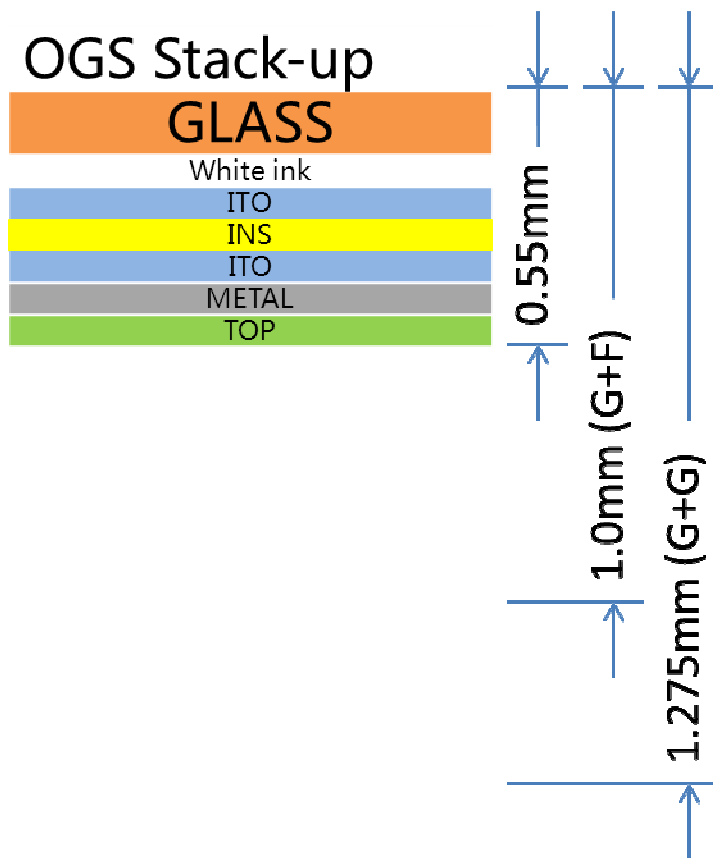
After

- ◆ Reduce internal reflections of ITO pattern
- ◆ Less color difference between black ink & touch screen
- ◆ High transmittance improves optics in sunlight

Ultrathin OGS

Thinnest OGS touch screen in mass production: **0.55mm**

G+F touch screen = 1.0mm; G+G touch screen = 1.275mm



Example of Orient Display Leadership

- Ultra Thin 5.0" HD TFT
- 720 x 1280 IPS TFT
- MIPI Interface
- 440 nits at Surface
- Integrated CTP with OGS
- Optical Bonding
- FT5336 CTP Controller
- 2.3mm Thin Total
- Toper = -20C to +70C

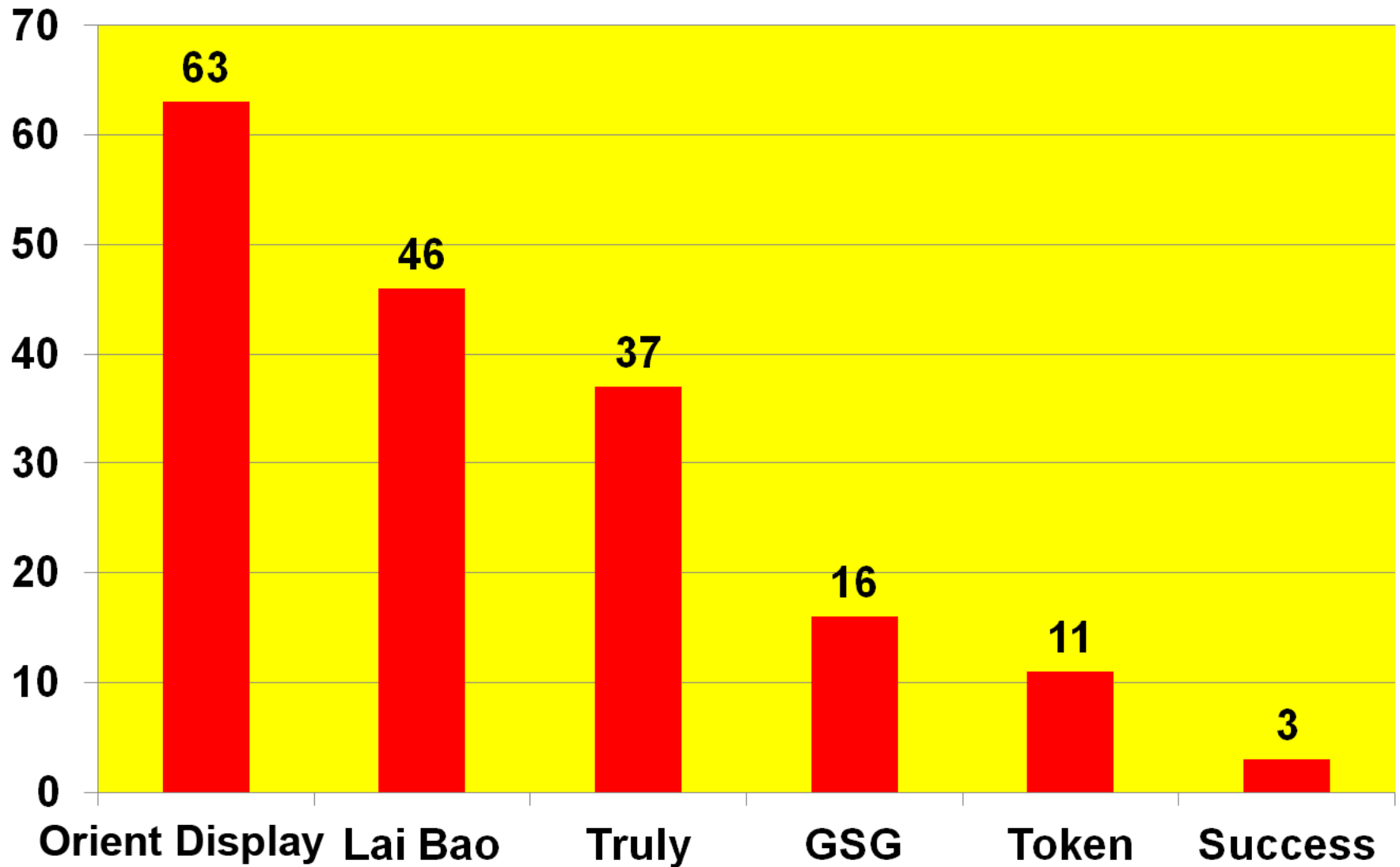


First Lady Uses Orient Display CTP



Orient Display = #1 in P-CAP

China Patents for Capacitance Touch



**We Hope to Create a Partnership with
You**



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