

**LCD Module**

**Touch  
Panel**

**Optical  
Bonding**

**One Glass  
Solution**

# **Orient Display (North America) Limited**

**YOUR TOTAL SOLUTION PROVIDER**

# Orient Display Agenda

- Company Overview
- Roadmap
  - Technology
  - Product Mix
  - Total Solution Provider
- Target Markets
- 2022 Focus Market
- Reminders

# COMPANY OVERVIEW

# Orient Display: Global Locations



# Orient Display: Shenzhen Factory

- Special Economic Zone
  - One of Five in China
  - Special Trade Benefits
- Harbor City
- Population: 18 Million



Shenzhen Headquarter



Dongguang Factory



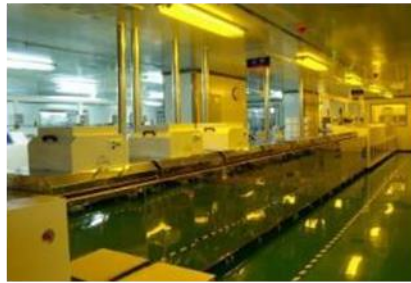
Ganzhou New Industrial Park

# Orient Display: Monochrome BU

- LCD Plant Overview
    - Production floor space: 12,000m<sup>2</sup>
    - TN / STN /VTN / Shutter
  - Manufacture Sites
    - Ganzhou
    - Dongguan
  - Monthly Capacity
    - 120K sets 14\*16" Substrates
- LCM Plant Overview
    - Production floor space: 2,500m<sup>2</sup>
    - COB / COG LCM, LCD + Backlight Unit
  - Manufacture Sites
    - Ganzhou
  - Monthly Capacity
    - COB Module: 500Kpcs
    - COG Module: 1,200Kpcs



Exposure Room



Developing and post  
baking line



COG Bonding Line



AOI Inspection



COB Bonding Machine



# Orient Display: TFT & Touch Panel BU

- CTP
- Established in 2009
- Production Space: 8000m<sup>2</sup>
- Clean Room Level: 1000 class (Partially 100 & 10000)
- Process: Lens, G-Sensor, F-sensor, FPC Bonding,
  - GG/GF/GFF Lamination
- Production Lines: Glass Sensor :1 / Film Sensor: 1 / GG/GFF Lamination: 8
- Manufacture Site : Shenzhen

- TFT
- Founded in 2014
- Production Space: 2000m<sup>2</sup>
- Clean Room Level: 1000 class → Class 100
- Process: substrate scribing, polarize attachment,
  - IC COG bonding, FOG, backlight / RTP / CTP
  - Assembly, OCA/LOCA Lamination
- TFT Production Lines: 3 , Full lamination (OCA): 4
- Manufacture Site : Shenzhen



COG Production Line



Polarizer Attach



Exposure Room



Full Lamination

# Orient Display: Red Carpet Service

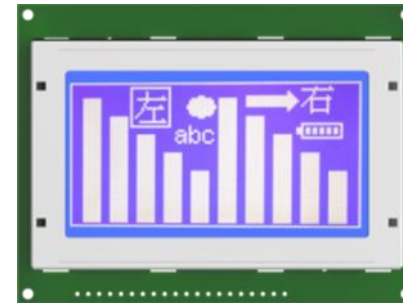
- 24-hour response to all communications.
- Delivery
  - From stock on many products.
  - 3-4 weeks for initial samples of customized products.
- RMA Response
  - 3 days for initial analysis after sample receipt
  - 4 days for detailed 8D report.
  - Orient engineers can assist with communication to end customer for special cases if required.
  - Timely follow-up of corrective actions.



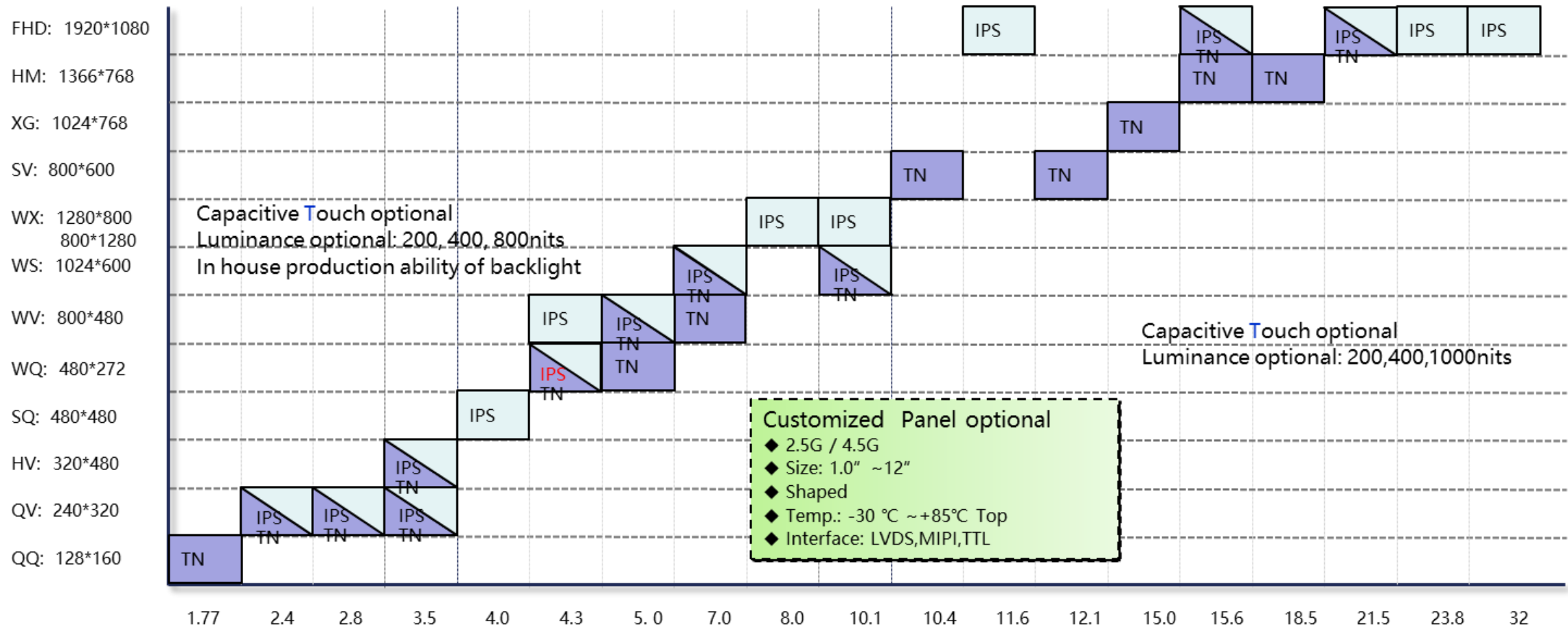
# COMPANY ROADMAP

# Orient Display: Product Mix - Monochrome

- COB Module
  - Character Module: 8\*1~40\*4
  - Graphic Module: ~1/240 duty
  - Segments Module: Customization
- COG Module
- LCD Panel
  - TN / STN / FSTN
  - VTN LCD
  - LCD Shutter



# Orient Display: Product Mix – TFT with Touch



# Orient Display: Product Mix TFT

- Industrial TFT: ~32"
  - Sweet Spot 1.77"~10.1" Standard Product
- In-Plane-Switching (IPS) for all angles viewable
- High Luminance (1000-nits)
- Wide Temp (-30C to +85C)
- Touch Module
- TFT Bar



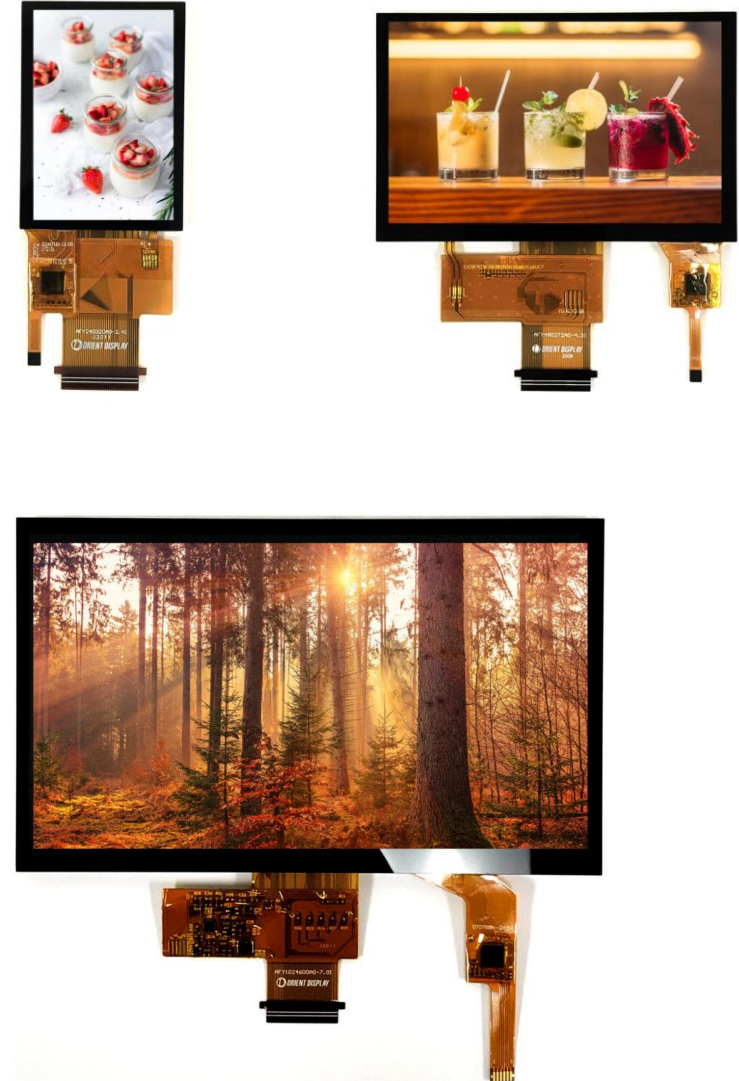
# Orient Display: TFT + PCAP

## PCAP

- Size: 1.2"~32"
- Lens Customized: Size, Screen Printing, Thickness, Shape, etc.
- Sensor: Single touch, Multi Touch
- IC: Industrial, Automotive grade, Consumer, Non-Consumer grade
- Structure: G+G, G+FF, P+G

## LAMINATION

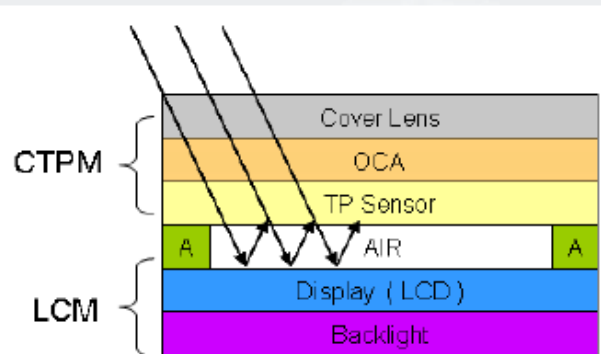
- Air Bonding: ~32"
- OCA: 1.2"~13.3"
- LOCA: 1.6"~32"



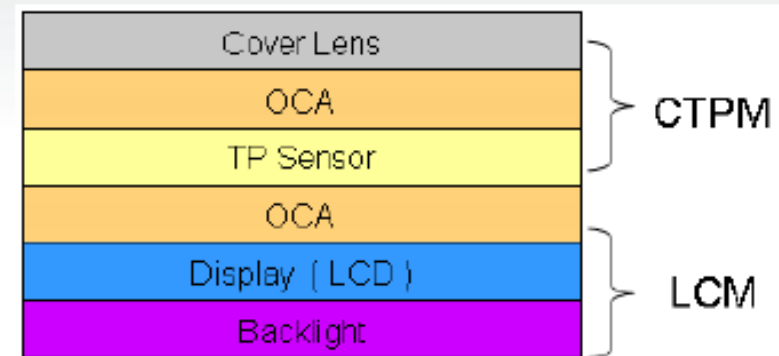


# CTP Design Flow-CTP+LCM Bonding Solution

## Air Bond



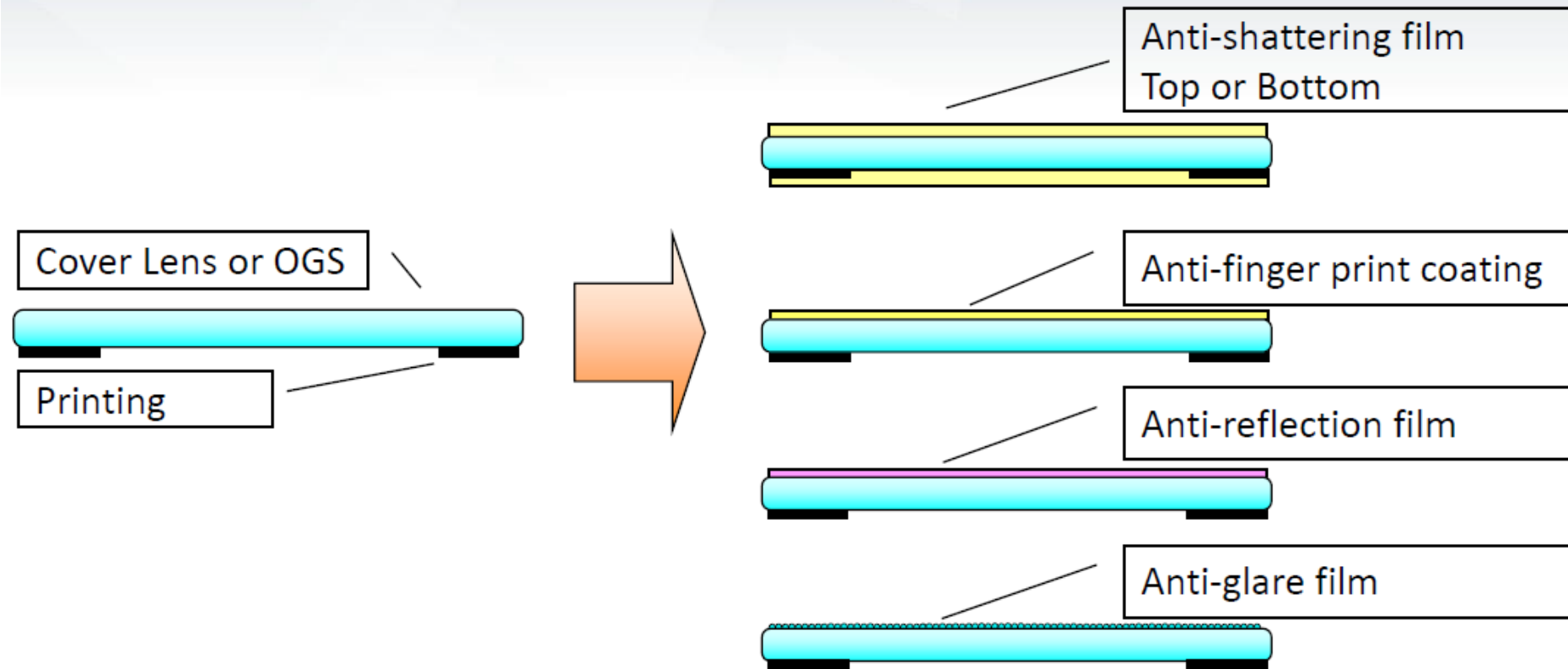
## Optical bonding (Full Lamination)





# Orient Display: CTP Surface Treatment

## CTP Surface Treatment(Optical )



# Anti-Shattering Film Protection

## Features:

- Thickness: 100um
- Hardness: 2H (750gf)
- Transparent Rate: >90%
- Haze: 0.5%



With ASF

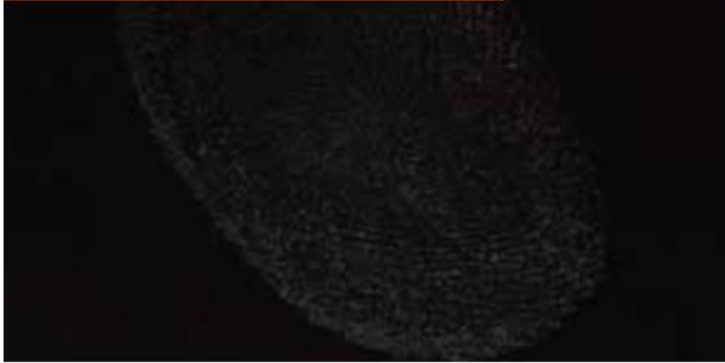


Without ASF

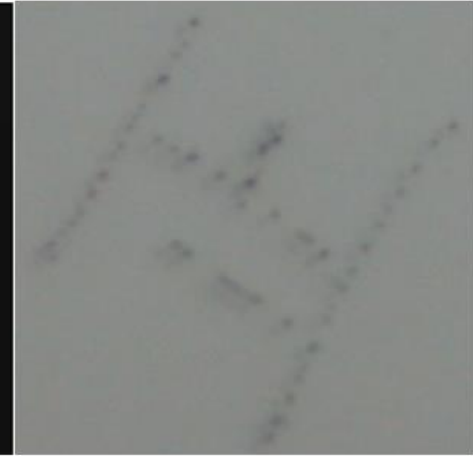


# Anti-Finger Print Treatment

With AF treatment



After wipe



Untreated

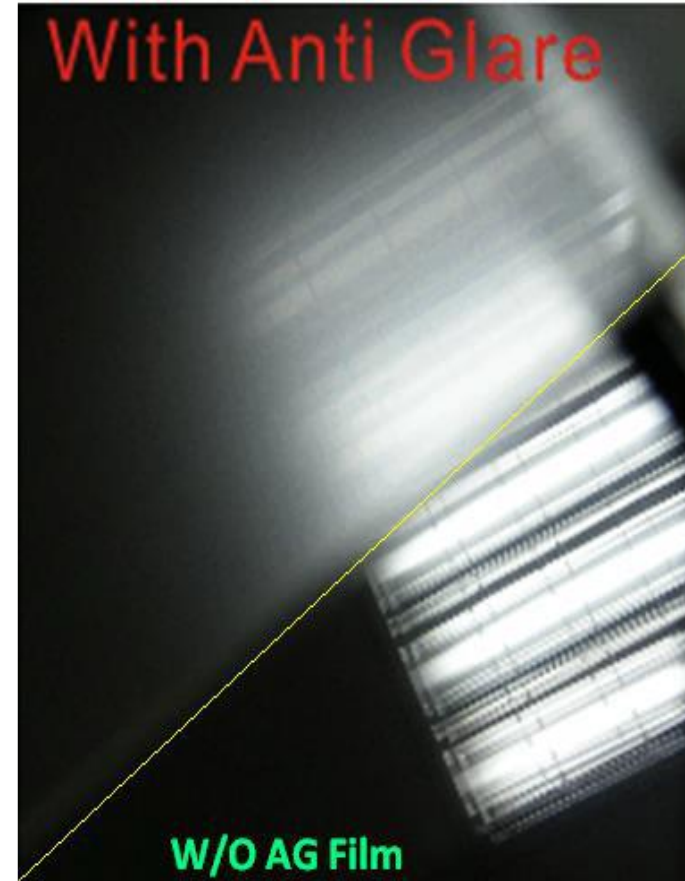
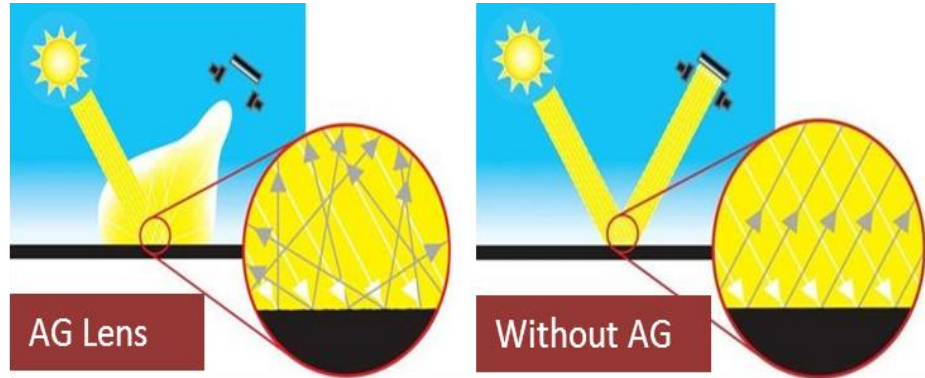


After wipe



**Anti-fingerprint coating/film, Excellent water and oil repellency for glass surface; Ultra slippery, Improve touch screen operability**

# Anti-Glare Treatment Technology



## Features:

- Thickness: 154um
- Hardness: 2H (750gf)
- Transparent Rate: >90%
- Haze: 8%, 12%, 25%, etc.

# Glove Operation

- Support different material: Cotton, Leather, Wool, etc.
- The maximum thickness can up to 5mm;





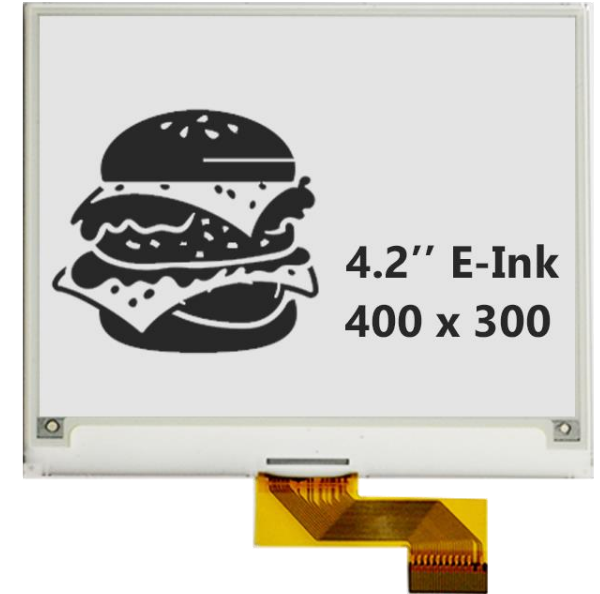
# Orient Display: PM-OLED Displays

- Passive Matrix Organic Light Emitting Diode Displays
- 0.66" to 3.12"
- 4-wire SPI Interface
- Monochrome
  - White/Black
  - Yellow/Black
  - Blue/Black
- Color
- Available with FPC or Module Format
- Available with Arduino I/F Board

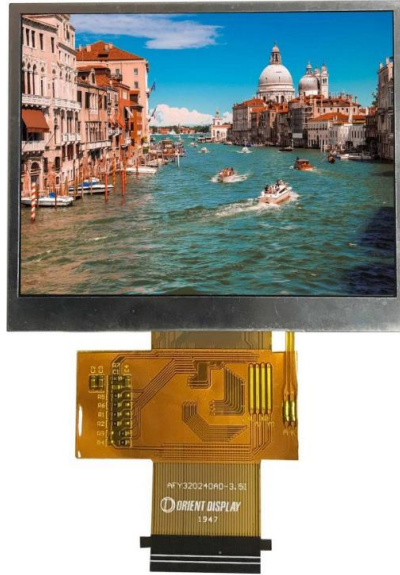


# Orient Display: E-Paper Display

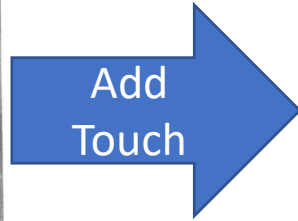
- For very low power applications
  - Bi-stable technology only uses power with image change
- Reflective technology; no backlight required
- Black and white display
- Viewable from all angles; no color inversion
- 1.54" to 7.5" sizes
- 3-4 Wire SPI Interface



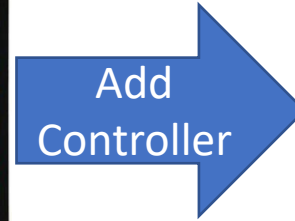
# Orient Display: Total Solution Provider



AFY320240A0-3.5IN TH  
3.5" LCD Only



AFY320240A0-3.5IN TH-C  
3.5" LCD with Touch



AGN320240A00-3.5N12NSH-R  
3.5" Full-Color Embedded Display

# LCD Embedded Controller Solutions

- The new embedded product series involves 0.96 inch to 10.1 inch LCD screens
- The main product series are
  - P series – SPI interface command display
  - U series - Small size serial command display
  - M series - high-quality monochrome TFT display
  - 15.6” FHD “Touch Plus” Module

# LCD Embedded Controller – P Series

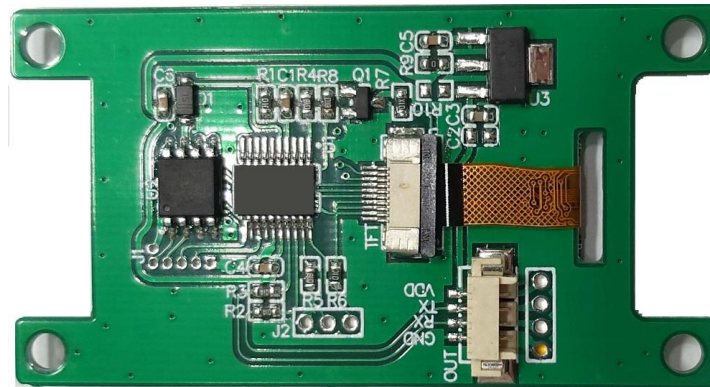
- Size: 3.5", 4.3", 5.0" and 7.0"
- **Interface: 4-line SPI**
- Touch panel: RTP and CTP
- Pre-burned pictures are saved in the flash of the display board. The flash can be controlled either by the controller IC on the display board itself or by the IC on customer's board, it's done by setting the GPIO level on the board. Customer can update photos or save parameters in the flash.





# LCD Embedded Controller – U Series

- Size: 1.44", 1.77", 2.0", 2.4", 2.8"
- Interface: 8N1 UART 232
- Operating voltage: 3.3V and 5.0V
- FLASH on board is 100% open to users. User can save fonts library, pictures or other parameters in the flash freely by configuring the corresponding address in command.



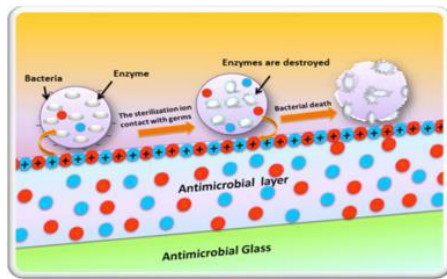
# LCD Embedded Controller – M Series

| Size | Pixels  | Bright. | interface | Features                                  | Model                | Driver IC |
|------|---------|---------|-----------|-------------------------------------------|----------------------|-----------|
| 4.8" | 240x128 | 500     | 8bit MCU  | Customized background and character color | AFM240128A0-4.8N6NTM | UCi6963   |
| 5.7" | 320x240 | 400     | 8bit MCU  | Customized background and character color | AFM320240A0-5.7N6NTM | UCi8835   |



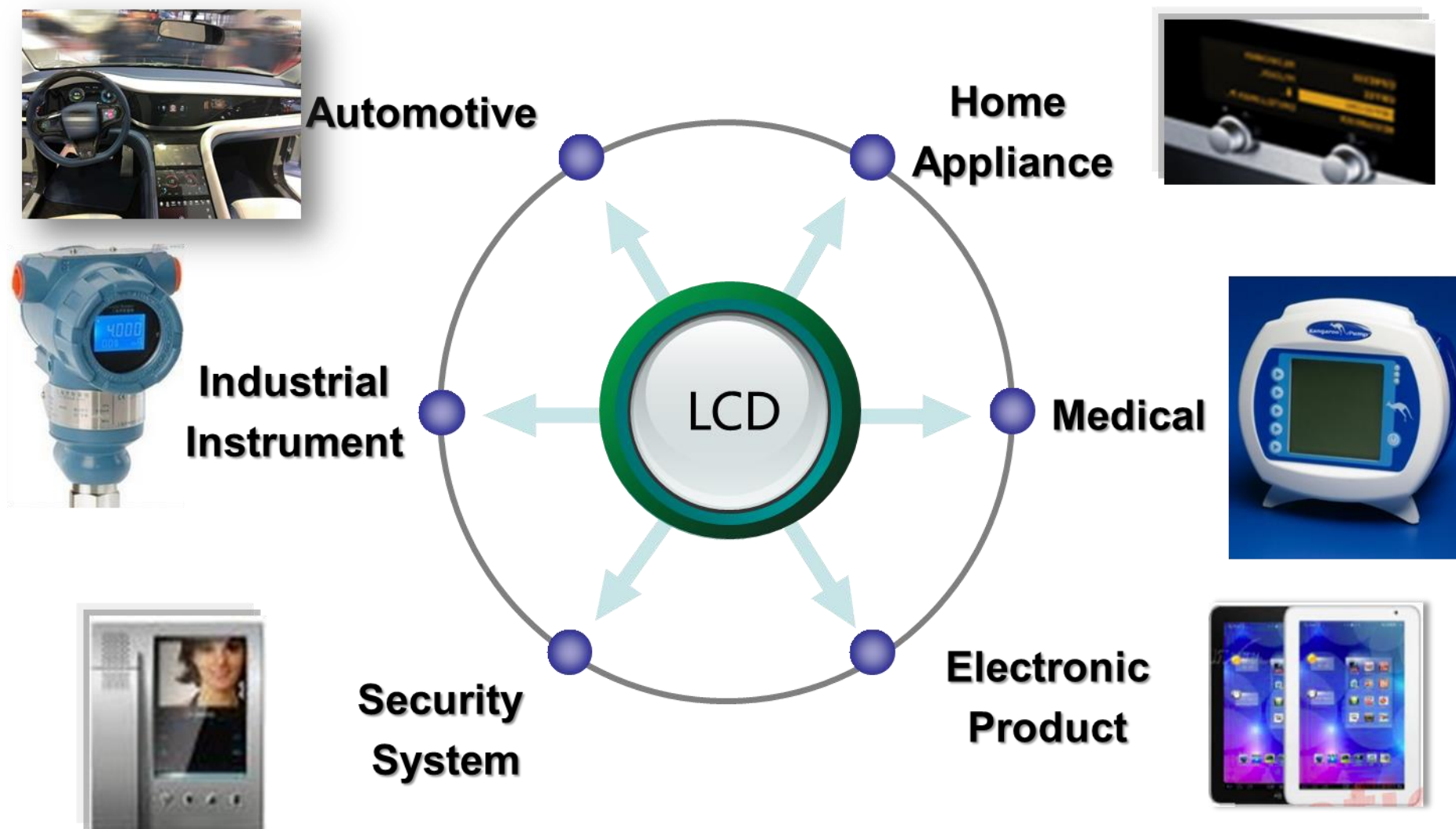
# Orient Display: 15.6" –Touch Plus Module

- This is Open Frame Computer with RK3288 quad-core CPU mainboard, intergraded Touch plus/air-touch technology, antibacterial cover lens, 15.6" FHD TFT LCD. Used in Android/Linux system.
- It is suitable for self service places, like bank, hospital, self check-in machine in airport/ train station/ subway station, elevator, express cabinet and so on.
- In all kinds of applications, it's deeply optimized algorithm and APP provides for non-contact touch and simple operation HMI solution.



# COMPANY TARGET MARKETS

# Orient Display: Target Markets





# COMPANY TARGETED MARKET In 2023

# Electric Vehicle Charging Stations: Display Mix

- Display Solutions for EV Charging Post
  - Mono LCD Module
  - TFT Module
  - Touch Display Module: TFT + Capacitive TP / Lens
  - Total Solutions: TFT + CTP + Control Board
- TFT module Options
  - TN / IPS
  - Top -20~+70 / -30~+80 or wider
  - Brightness: 1000cd/m2
- TFT Size / Status
  - MP: 3.5", 4.3", 7" (Top: -20~+70)
  - Sample: 4.3", 7" (Top:-30~+80)
  - Planning: 15.6" (Top:-30~+80)
- Touch Panel Options
  - IC: EETI / ATMEL / ILITEK
  - Lens:
    - Physical Tempered Glass
    - Ceramic Ink
    - Thickness: 3.2mm,4.0mm,5.0mm,6.0mm
- Total Solution
  - Control Board: UART Module、AD Board、 ARM Board



# Electric Vehicle Charging Stations: Display Mix

| Solution                   | Size | Resolution      | View Direction | Brightness (cd/m2) | Top (°C)   | Tst (°C)   | Lifetime (typ.) | Remark        |
|----------------------------|------|-----------------|----------------|--------------------|------------|------------|-----------------|---------------|
| TFT Module                 | 4.3" | 480*272         | IPS            | 1000               | -30 ~ + 85 | -30 ~ + 85 | 50K hrs         | Sample        |
| TFT Module                 | 7"   | 800*480         | IPS            | 1000               | -30 ~ + 85 | -40 ~ +90  | 50K hrs         | Sample        |
| TFT Module                 | 3.5" | 320*240         | TN 12:00       | 650                | -30 ~ + 85 | -30 ~ + 85 | 50K hrs         | Sample        |
| TFT Module                 | 4.3" | 480*272         | TN 12:00       | 1000               | -20 ~ + 70 | -30 ~ + 80 | 50K hrs         | Sample        |
| TFT + CTP+UART Board       | 3.5" | 320*240         | IPS            | 350(w/o TP)        | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         | Sample, RS232 |
| TFT + CTP+UART Board       | 4.3" | 480*272         | TN 12:00       | 500(w/o TP)        | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         | TTL           |
| TFT+ CTP+ UART Board       | 7"   | 800*480         | TN 12:00       | 500(w/o TP)        | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         | TTL           |
| TFT+CTP+AD Board           | 7"   | 800*480         | TN 12:00       | 900(with TP)       | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         | DVI           |
| ARM Board + Shell + System | /    | 1920*1200 (Max) | /              | /                  | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         |               |
| ARM Board +System          | /    | 1366*768 (Max)  | /              | /                  | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         |               |
| ARM Board + System         | /    | 1920*1200 (Max) | /              | /                  | -20 ~ + 70 | -30 ~ + 85 | 50K Hrs         |               |

# Available Solutions: 3.5" QVGA w CPT & Controller

- High performance UART serial module with 3.5" capacitive touch panel, which integrates Cortex-M4 MCU and 2D TFT graphical display accelerators.
- The main function is to provide UART serial communication, so that the host MCU can easily transfer the content to be displayed to the TFT driver through simple command.

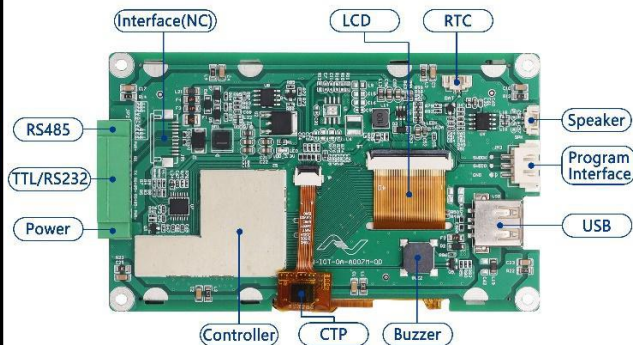


## Features

- Build-in M4 MCU, 512KB Flash, 512KB SRAM
- Embedded 128Mb Display RAM
- Provide Geometric Graphic feature and 2D graphical display accelerators
- Assortative UI-Editor software
- Defaulted 320\*240 pixel resolution,
- Defaulted 5V DC, support customized power input
- Defaulted 1Gb Flash storage, support customized storage
- Defaulted TTL/RS232 interface, support customized RS485 interface
  - Defaulted RTC function, support optional
  - Defaulted buzzer function, support optional
- Standard with Capacitive Touch Panel
  - Can support customized Resistive Touch Panel

# Available Solutions: 4.3" WQVGA w CTP & Controller

- High performance UART serial module with 4.3" Capacitive touch panel, which integrates Cortex-M4 MCU and 2D TFT graphical display accelerators.
- The main function is to provide UART serial communication, so that the host MCU can easily transfer the content to be displayed to the TFT driver through simple command.



## Feature

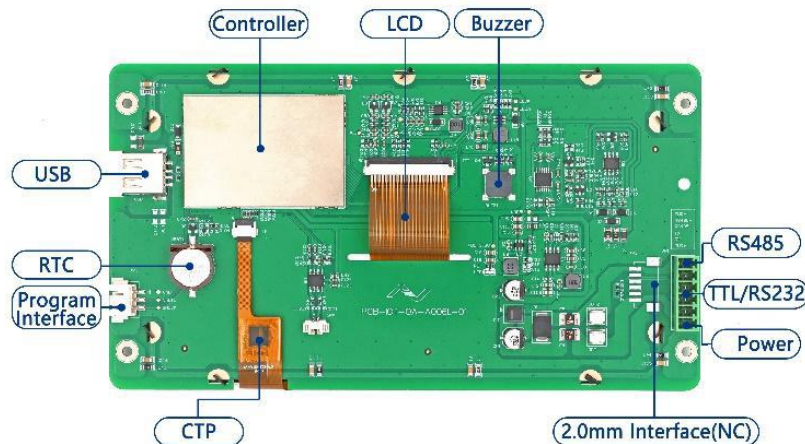
- Build-in M4 MCU, 512KB Flash, 512KB SRAM
- Embedded 128Mb Display RAM
- Provide Geometric Graphic feature and 2D graphical display accelerators
- Assortative UI-Editor software
- Defaulted 480\*272 pixel resolution, support customized under 1280\*1024 pixel (included)
- Defaulted 5V DC, support customized power input
- Defaulted 1Gb Flash storage, support customized storage
- Defaulted TTL/RS232 interface, support customized RS485 interface
- Defaulted RTC function, support optional
- Defaulted buzzer function, support optional
- Defaulted DAC audio output, support optional
- Defaulted Capacitive Touch Panel
  - Support customized Resistive Touch Panel



# Available Solutions: 7.0" WVGA w CTP & Controller

## SDM-L769070CN-A0-S

- High performance UART serial module with 7" Capacitive touch panel, which integrates Cortex-M4 MCU and 2D TFT graphical display accelerators.
- The main function is to provide UART serial communication, so that the host MCU can easily transfer the content to be displayed to the TFT driver through simple command



## Feature

- Build-in M4 MCU, 512KB Flash, 512KB SRAM
- Embedded 128Mb Display RAM
- Provide Geometric Graphic feature and 2D graphical display accelerators
- Assortative UI-Editor software
- Defaulted 800\*480 pixel resolution, support customized under 1280\*1024 pixel (included) and 16/18/24bits RGB interface display
- Defaulted 12V DC, support customized power input
- Defaulted 1Gb Flash storage, support customized storage
- Defaulted TTL/RS232 interface, support customized RS485 interface
- Defaulted RTC function, support optional
- Defaulted buzzer function, support optional
- Defaulted DAC audio output, support optional
- Defaulted Capacitive Touch Panel
  - Support customized Resistive Touch Panel
- Support UART, USB2.0/SD card, support USB2.0 upgrade program and SPI data
- Support WIFI/BT module

Thank you for your time!