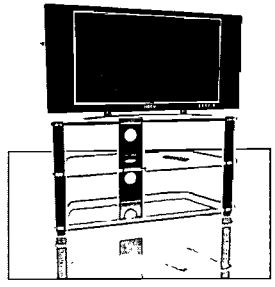
California Energy Commission
Docket Number 09-AAER-1C

TAOS

Digital Ambient Light Sensing For Flat Panel Display (FPD) Televisions

October 13, 2009



TEXAS ADVANCED OPTOELECTRONIC SOLUTIONS

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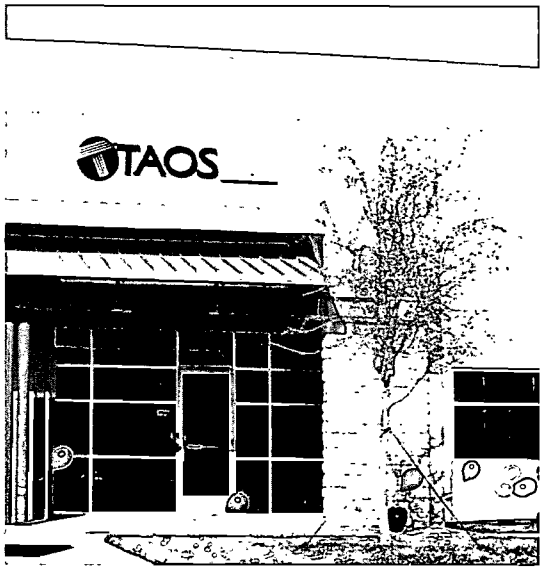
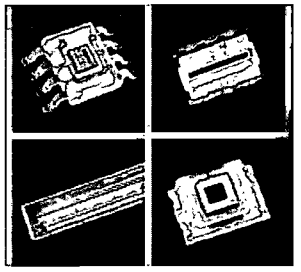
LCDTV Association
SUSTAINING MEMBER

Texas Advanced Optoelectronic Solutions





- Privately-held Company Founded in 1988
- Spin-off from Texas Instruments
- CMOS Optoelectronic Sensor Innovator
- Fab-less Semiconductor Company
- Worldwide Headquarters in Plano, Texas
- Offices in South Korea and Germany
- ISO9001:2008 Certified
- 30-50% Annual Revenue Growth from 2005-2009
- Top 100 Fastest Growing Companies in Dallas-Ft. Worth Metroplex Last 2 Years

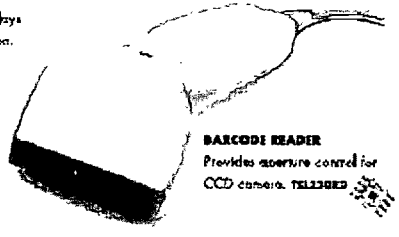
LIGHT SENSING IN EVERYTHING WE DO

TAOS

PUTTING TAOS LIGHT SENSING SOLUTIONS TO WORK

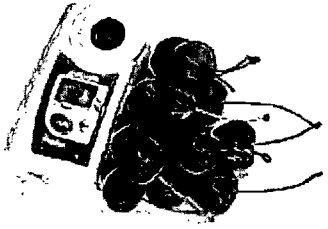
PULSE OXIMETER
A non-invasive means of determining arterial blood oxygen level by utilizing selected wavelengths of light.
TSL237 and TSL235R

COLOR SENSING
Calibrates computer displays for accurate color rendition.
TSL237 and TSL235R

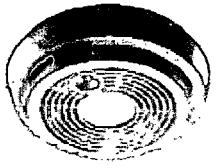


BARCODE READER
Provides aperture control for CCD camera. TSL230RD

LAPTOP COMPUTER
Display backlight control for portable equipment.
TSL2560, TSL2560 or TSL2562

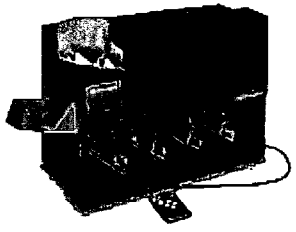


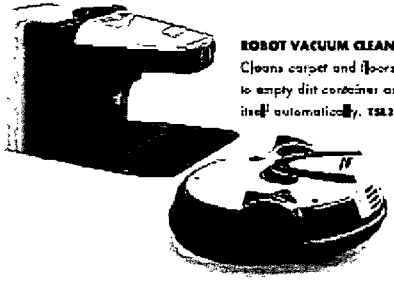
BRIX METER
Measures the sugar content concentration of fruit juices, foods, drinks, and condiments.
TSL1401CS



SMOKE DETECTOR
Simplified smoke detector design with improved performance. TSL2567

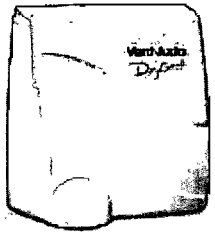
MONEY CHECKER
Verifies that currency is valid by distinguishing characteristics in the ink or paper.
TSL250R and TSL210



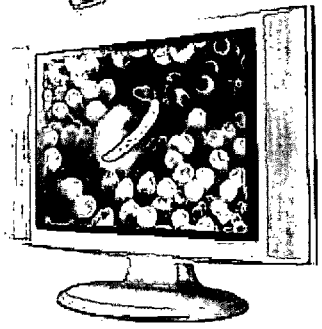


ROBOT VACUUM CLEANER
Cleans carpet and floors and docks to empty dirt container and recharge itself automatically. TSL2638

HAND DRYER
Infrared sensor detects presence of a user to signal the blower fan to turn on. TSL2618

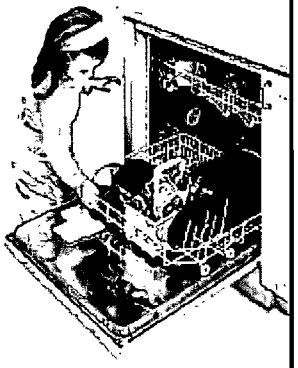


FLAT PANEL DISPLAYS
Optimum viewing is maintained in diverse lighting conditions by controlling the display panel backlighting.
TSL2561



COLOR PALETTE
Pocket-sized electronic instrument takes the guesswork out of matching colors to paint store swatches.
TCS230

STEERING ANGLE SENSOR
Monitors steering wheel angular rotation and velocity for control of automobile stability and braking.
TSL1401CS

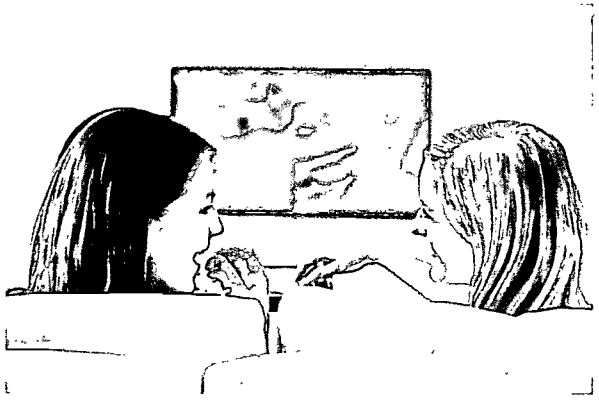


DISHWASHER
Turbidity sensor for dishwashers. Answers the question, are your dishes clean? TSL230R

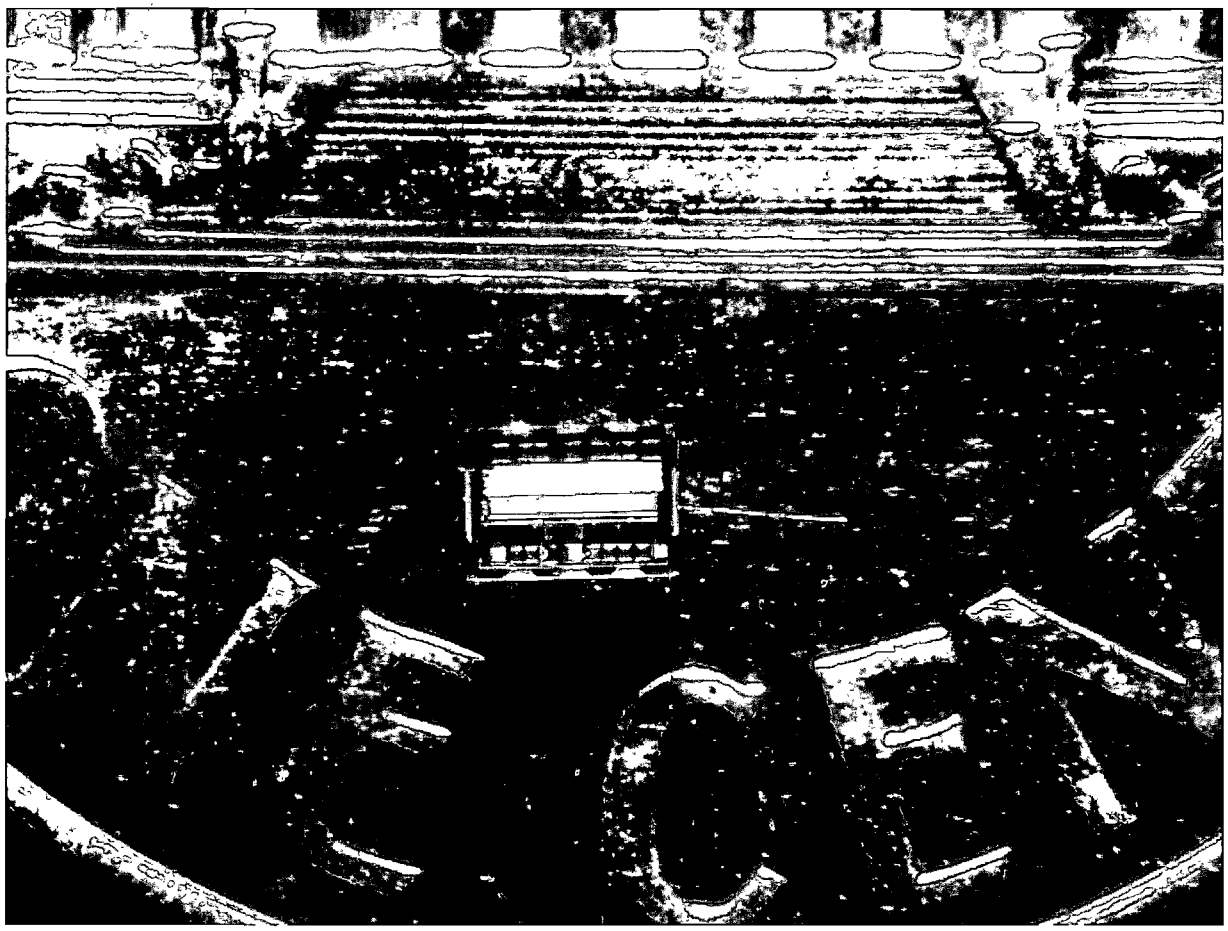
PORTABLE SCANNER
Hand held scanner that captures, translates and/or defines words.
TSL1401R

What is Digital Ambient Light Sensing?

The ability to measure surrounding ambient light brightness as perceived by the human eye using a light sensor to automatically adjust the brightness level of an LCD or Plasma Flat Panel Television and/or illuminated keyboard

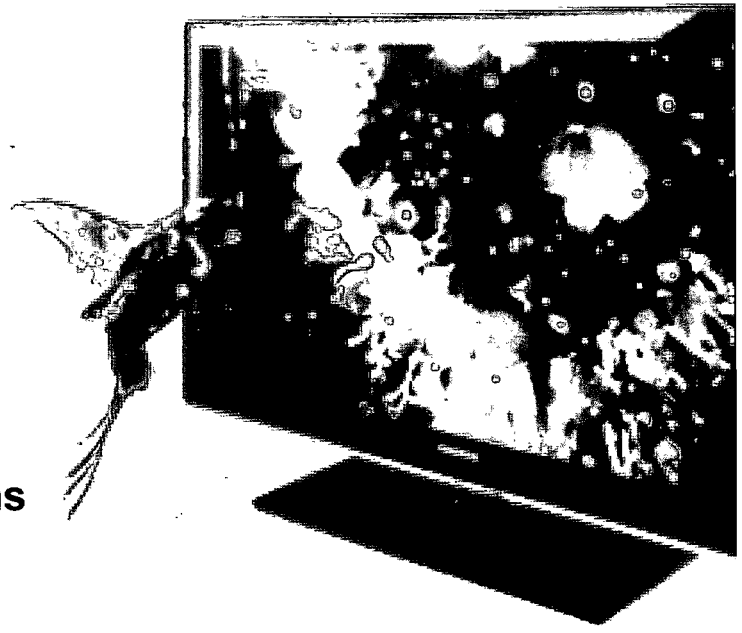


TSL2560 Digital Ambient Light Sensor



Benefits of Digital Ambient Light Sensing

- **Automatically Adjusts Display Brightness**
  - **Saves Power**
    - **Reduce Display Power By As Much As 30%**
    - **Increased Energy Conservation – "Green"**
  - **Extends Display Life**
    - **Displays Degrade With Time**
    - **Higher Brightness/Faster Degradation**
  - **Reduces Eye Strain**
    - **Knowledge of color temperature allows optimal viewing in diverse lighting conditions (fluorescent, incandescent and sunlight)**
    - **Dims display in Low Light**
    - **Bright display in High Light**
  - **Improves Display Aesthetics**
    - **No Washout**
    - **No Overdriving Of The Display**
  - **Supports LCD and Plasma Displays**



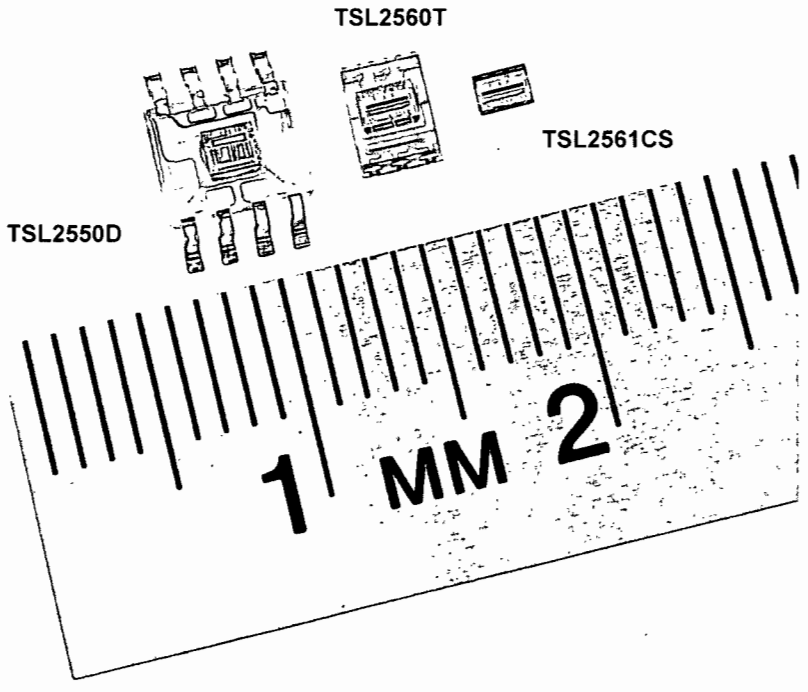
Digital Ambient Light Sensor Pioneer

TAOS

- Launched industry's first Digital Ambient Light Sensor in 2002
  - Enables displays to adjust screen brightness automatically
  - Highly intelligent subsystem, that once configured, can operate independently
  - Digital = Fewer Components, Reduced Software Overhead, Less System Cost, Better Response Over Wider Range of Light Levels

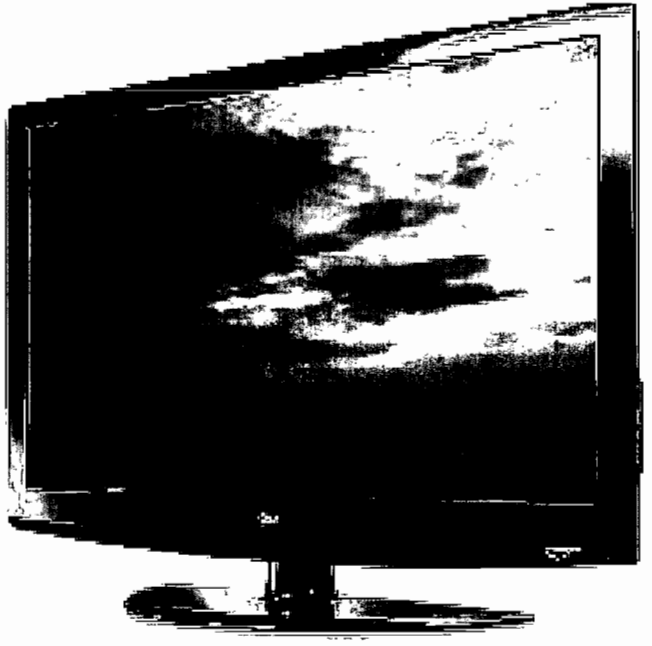
ELECTRONIC PRODUCTS
PRODUCT OF THE YEAR
WINNER - 2002

- Since 2002, TAOS has introduced a series of enhanced Digital Ambient Light Sensors
  - Faster system performance
  - Increased light sensitivity (>30x)
  - Operates behind TV bezel (plastic or darkened glass)
  - Leading volume supplier
  - Shipped 100's of millions to Fortune 100 customers
  - Proven, mature technology



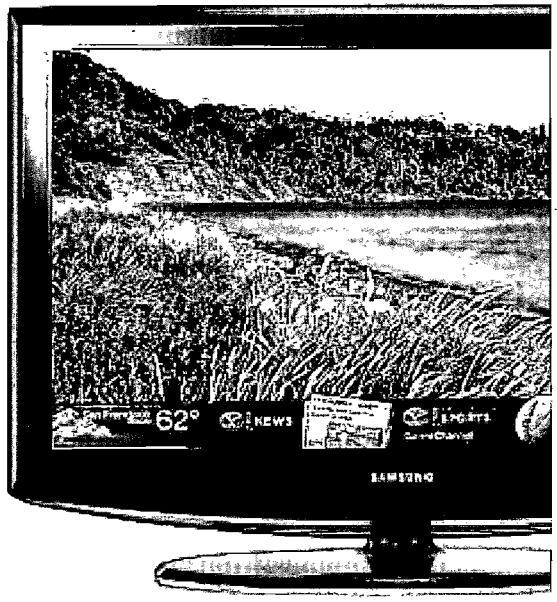
What is Proximity Detection?

The ability to detect the presence or absence of an object or person using a light sensor to automatically turn off or turn on the display for an LCD or Plasma Display Panel (PDP) Television



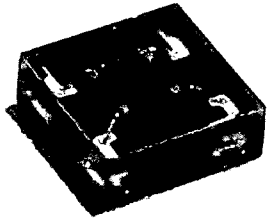
Benefits of Proximity Detection

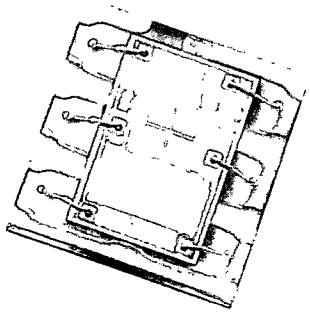
- Automatically Detects Proximity of Individual
  - Detects Presence or Absence of Object
    - Automatically Turns Display Off or On
    - Gesture Detection
  - Saves Power
    - Reduce Overall Display Power Consumption
    - Increased Energy Conservation – "Green"
  - Extends Display Life
    - Displays Degrade With Time
    - Higher Brightness/Faster Degradation
  - Sound Can Remain On While Display Turned Off

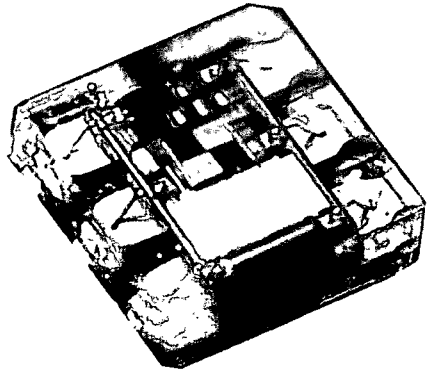


NEXT GENERATION

- In 2008, TAOS Developed Next Generation Ambient Light Sensor that Integrates Proximity Detection
  - Both Ambient Light Sensing and Proximity Detection work at the same time
  - Mobile phones have already adopted this technology to extend battery life
  - Other applications include notebooks/netbooks, monitors, POS kiosks
  - Up to 1 meter today with extended distance in-development







Digital Ambient Light Sensors Dramatically Reduces Energy Consumption

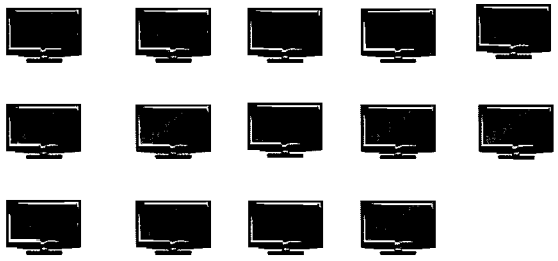
- **LG60 LCD TV with Intelligent Sensor™ consumes 69.5% less electricity than prior models of same display size**
- **Saves power by controlling intensity of TV's backlight**
- **Provides optimal picture quality - Automatically adjusts brightness, contrast, color, sharpness and white balance**
- **First LCD TV Association "Green TV" certified product**

Source: LG Press Release, 8/27/08
Intelligent Sensor is trademark of LG Electronics

Digital Ambient Light Sensors (ALS) Save Money And Conserve Energy

TAOS

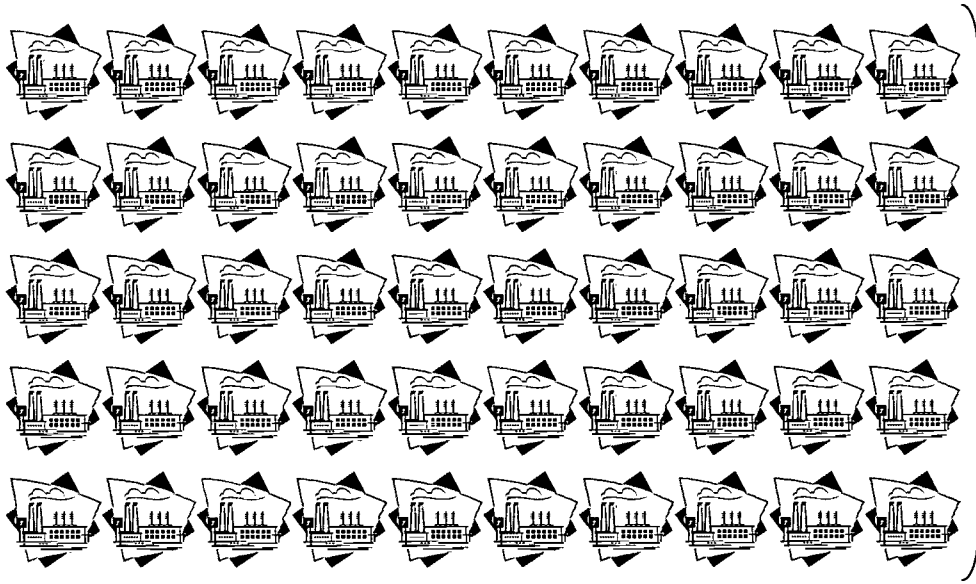
Total # US TV's (est)



= 20M TV's

= 1B KWh

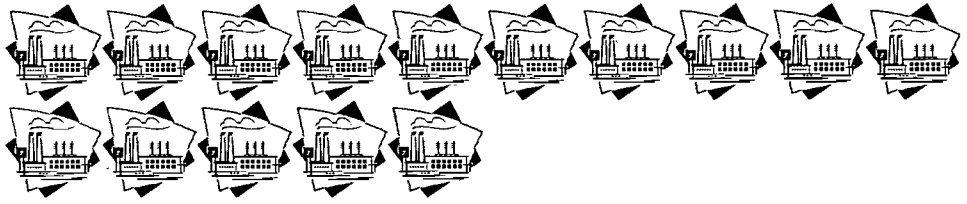
Total Annual US TV Energy Consumption (est)



50B KWh

Annual US Energy Savings With ALS

$1.7B =



15B KWh

Source: EPA Energy Star Website, 2009
Annual Savings @ $0.115/KWh in US (http://www.eia.doe.gov/cneaf/electricity/epm)

Automatic Light Sensing Helps Televisions Use Less Power

- ***Automatic Light Sensing*** = Ambient Light Sensing
- Reduces TV Power Consumption By As Much As 30%. Adoption of Proximity Detection Would Further Increase Energy Savings
- Provides Optimal Picture Quality
- Mature, Proven Technology
- Shipped 100's of Millions to Fortune 100 Companies
- Supports Both LCD and Plasma Displays
- Environmental "Green" Friendly

Global Television Eco-System

AmTRAN
AMD
VIZIO
BROADCOM.
MStar semiconductor
SHARP
SAMSUNG
TATUNG
SONY
ZORAN
LG
BenQ
TOSHIBA
LOEWE.
Haier
FUNAI
DIGITAL VISUAL ENTERTAINMENT
FOXCONN
wistron
Westinghouse
AOC
KONKA
Panasonic
Hisense
AUO
Skyworth
TPV
TPV TECHNOLOGY LIMITED
PHILIPS
VESTEL
MEDIATEK

TAOS VISION

TAOS

Thank You

"SHAPING THE FUTURE OF LIGHT SENSING SOLUTIONS"