

FROM CRT TO OLED

THE Evolution of Televi

Long Shizhu



The Evolution of Television

Design

Thick → Thin

B&W → Color

Low → High

Resolution

LCD → LED
CCFL Backlit → LED backlit



CRT



RPTV



PDP



LCD TV



OLED



The First TV set in the world

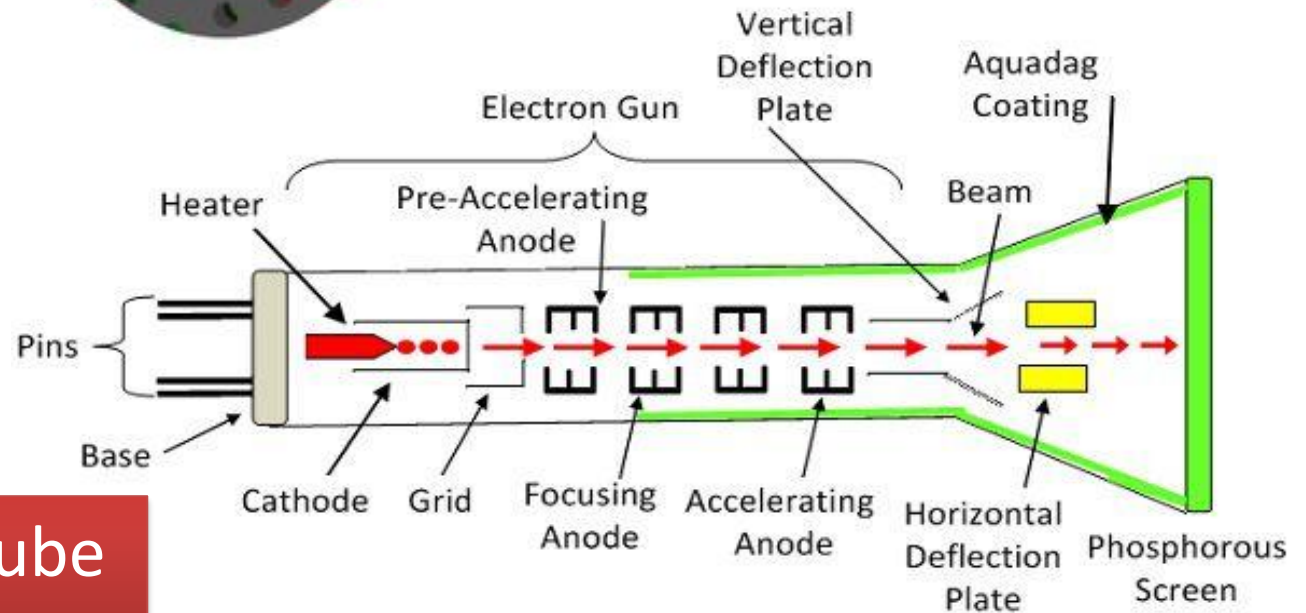
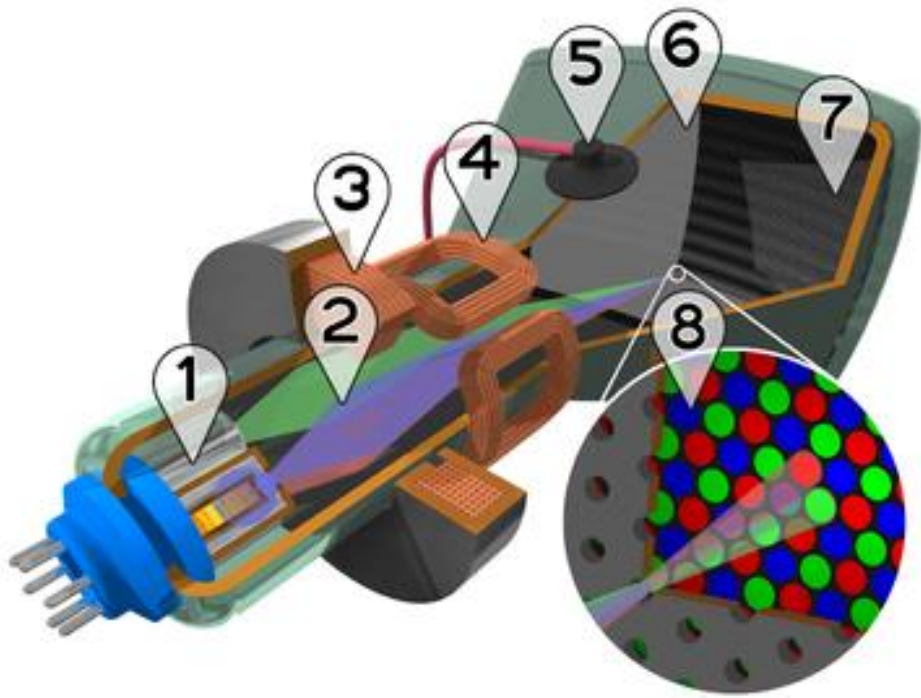


The world first **color**
TV set



CRT displays went from **B&W** to **color**,
from **spherical** to **cylindrical** to **flat right
angles**, until pure flat





Cathode Ray Tube (CRT)

Cathode Ray Tube

CRT TV SUMMARY



Advantage

Low production costs and low prices.

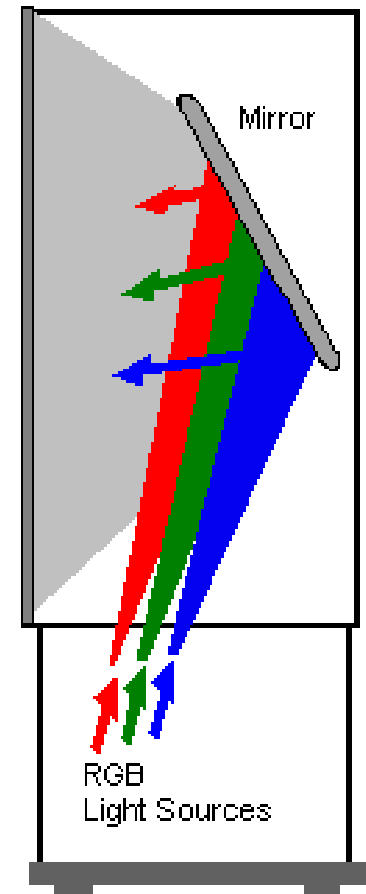
Weakness

Limited by the picture tube, can't make more than 34 inches Big screen TV.



REAR PROJECTION
Screen and projector
are combined.

Fixed
Size
Viewing
Screen



RPTV Summary



The shortcomings of rear-projection TV are also obvious. It is large and cumbersome. After a brief glory, it was abandoned

Advantage

The TV is large in size and has a wide view. The imaging has a long service life and high brightness

Weakness

The body is heavy, and the brightness of the bulb is reduced after a long time of use. Need to replace the bulb.

Plasma TV



Panasonic TH-P60S60C Plasma TV

Plasma TV uses Plasma Display Panel, which is a device that injects mixed gas between two ultra-thin glass plates and applies voltage to illuminate with phosphor.

Plasma TV Summary



Advantage

The picture clarity is high, there is no tailing situation, the price of the same size product is much lower than the LCD TV.

Weakness

Screen Reflection, screen burn (burn-in)



The development of LCD TVs has drawn a perfect ending for CRT TVs.

L
ED
TV



AN LED TV IS AN LCD TV

LCD Backlit TV



LED Backlit TV



LED Crystal Liquid TV Summary



Advantage

Compared with CRT TVs, power consumption is greatly reduced, saving energy.

Weakness

High-speed motion picture, with a slight tailing.

Comparison of plasma and LCD TV

	Plasma TV	LED TV
Advantages	<ol style="list-style-type: none">1. Good color reproduction and natural color2. Large dynamic range of dark field and rich image hierarchy3. Low trailing time and high dynamic resolution;4. Large viewing Angle and good brightness uniformity;5, easy to achieve large screen.	<ol style="list-style-type: none">1. Complete size and model2. Small size, relatively thin, low power consumption;3. The image has no interline and large area flashing;4, high brightness5, Not easy to cause ghost image and burn-in.

Plasma TV

LED TV

Weakness

1. Few screen size, no small size model;
2. Large volume, large weight and high power consumption;
- 3, because of high temperature discharge, prone to burning screen
4. The brightness is low and the particle sense is obvious;
5. The heat is large and the noise is obvious.

1. The viewing Angle is small;
2. Motion image is prone to drag;
- 3, LED high-energy blue light is too high, harmful to vision, easy to produce light leakage, the brightness uniformity is poor;
4. Small dynamic range of dark field and poor contrast;
5. Poor color reproduction and small color coverage.

Why Plasma TV Retreat in Defeat



The champion of plasma Panasonic ceased plasma production in November 2013 , Stopped all plasma business in March 2014

In January 2013, LG Electronics released the LG curved OLED TV for the first time at CES, indicating that the world has entered the era of large-size OLED.



The Beginning of the OLED Era

OLED (Organic
Light-Emitting
Diode) TV



OLED is the third generation display technology after CRT (first generation CRT TV), LCD, PDP (second generation LCD TV), which can be regarded as the latest display technology. The color layer of the OLED has self-illuminating properties, using a very thin organic coating and a glass substrate, and when the current passes, the organic material displays color and emits light. The emergence of OLED has completely changed the problem that LCD TVs need backlighting, and once again, the thickness of the display is greatly reduced.



Due to the self-illumination and the independent illumination of each pixel, the OLED makes the TV thinner and makes the response speed much faster than that of the LCD TV. Whether it is from black field brightness, wide viewing angle, full color gamut, low energy consumption, or its foldable and bendable characteristics, OLED has greatly expanded the imagination of TV physical form. Known in the industry as the most competitive fantasy display in the future.

OLED TV advantages:

1. OLED has a solid structure and no liquid crystal molecules inside. It has certain anti-vibration
2. OLED display can be self-luminous, so no backlight is needed.
3. High contrast, wide viewing Angle, fast reaction speed and wide range of temperature
4. The structure and process are simple, rich in color and high in resolution
5. Ultra-thin panel and low power consumption.

Weakness

Lifetime - While red and green OLED films have longer lifetimes (46,000 to 230,000 hours), blue organics currently have much shorter lifetimes (up to around 14,000 hours).

Manufacturing - Manufacturing processes are expensive right now.

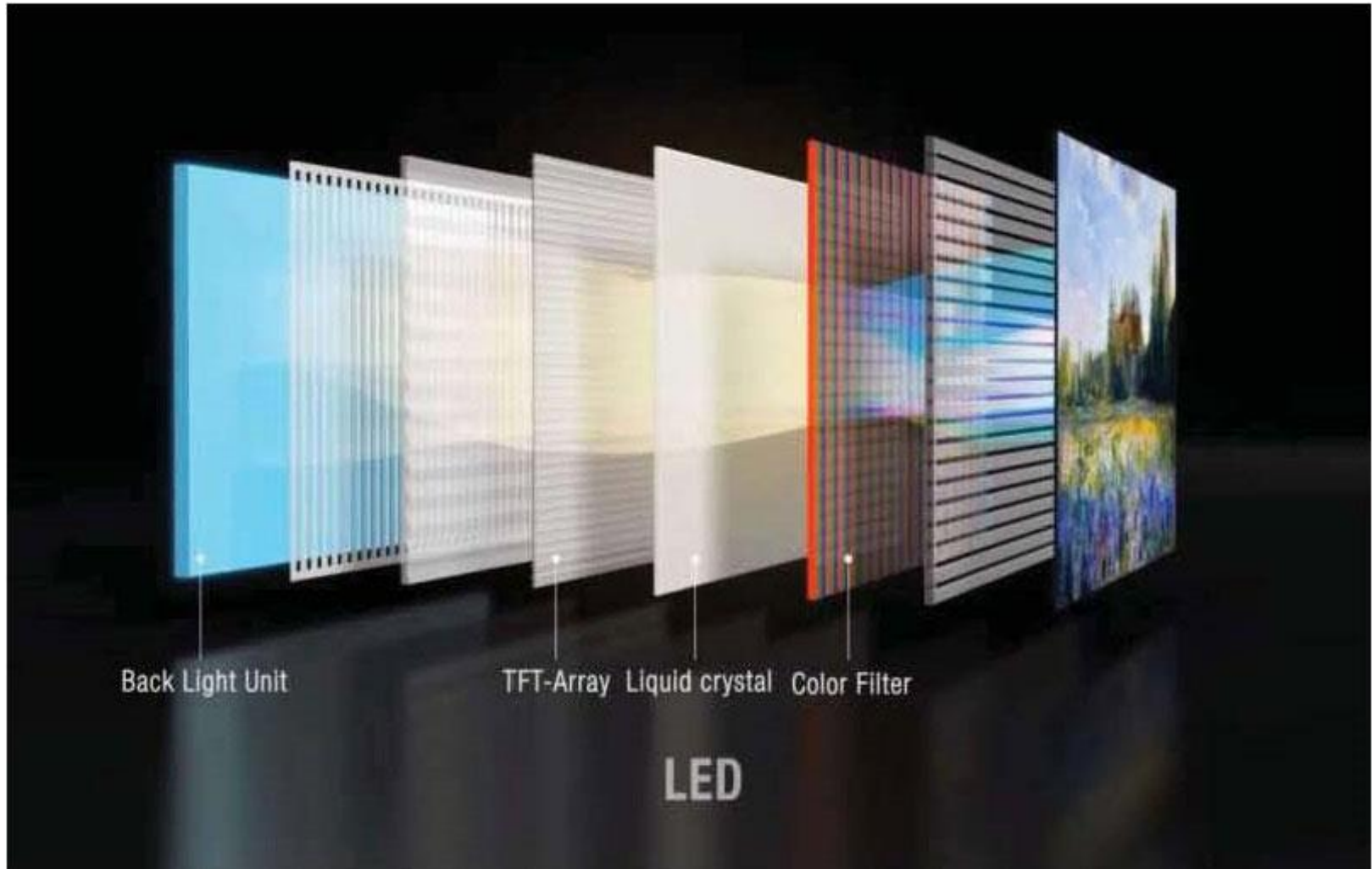
Water - Water can easily damage OLEDs.

OLED and LED TV Comparison

	OLED TV	LCD TV
Brightness	Loser	Winner
Black level	Winner	Loser
Contrast ratio	Winner	Loser
Resolution	TIE	TIE
Refresh rate motion blur	TIE	TIE

	OLED TV	LCD TV
HDR	TIE	TIE
WCG	TIE	TIE
Viewing Angle	Winner	Loser
Power	Loser	Winner
Price	Loser	Winner

QLED (Quantum dot technology ultra HD TV)



OLED TV and QLED TV Technology quick summary:

- **OLED** stands for "organic light emitting diode."
- **QLED** (according to Samsung) stands for "quantum dot **LED** TV."
- **OLED** is a fundamentally different technology from LCD, the major type of TV today.
- **QLED** is a variation of LED LCD, adding a quantum dot film to the LCD "sandwich."
- **OLED** is "**emissive**," meaning the pixels emit their own light.
- **QLED**, like LCD, is in its current form "**transmissive**" and relies on an LED backlight.

OLED and QLED TV Comparison

OLED PROS AND CONS

Pros:

Lighter and thinner
(2.57mm)
Self-lighting pixels
More convincing blacks
Faster refresh rate (0.001ms)
Judder and blur-free

Cons:

Only found in three screen
sizes: 55, 65 & 77-inch
Muted brightness (1,000nits)
Expensive

QLED PROS AND CONS

Pros:

Brilliant whites
Ultra-bright (1,500nits)
Variety of screen sizes
between 49-88-inch

Cons:

Not as slim (25.4mm)
Overly bright
Less convincing blacks
Slower refresh rate

Thank you