From REGZA to Cell REGZA

Digital Media Network Company
TOSHIBA Corporation
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Toshiba, Over 50 years experience of manufacturing TV

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tr>
<td>1927</td>
<td>A cathode ray tube made by Toshiba is the first in the world to receive a television image! Kenjiro Takayanagi succeeds in displaying a Japanese letter on a TV screen. This marks the start of Toshiba’s leading role in the development and mass production of TVs.</td>
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<td>1947</td>
<td>Toshiba invents the black stripe picture tube, which eliminates poor color reproduction and boosts resolution and brightness. Many of major TV manufacturers adopt this technology.</td>
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<td>1982</td>
<td>Nearly-flat full square tube</td>
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<td>1989</td>
<td>Lavender Mask cutting reflections</td>
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<td>1995</td>
<td>Super Brightron Tube</td>
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<tr>
<td>1998</td>
<td>Full Flat Cathode Ray Tube</td>
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The accumulation of our experience and know-how has contributed directly to the super high-quality REGZA image.
We were rather late coming to FPD, but now we are chasing the top runners.

Toshiba's Technology Strategy

- **3 Pillars of Toshiba’s Strategy**
  - **High Picture Quality strategy**: Optimizing picture quality of all video contents
  - **Network strategy**: New TV Life accepting a variety of video contents
  - **Storage & Mobile strategy**: Presenting new way of use applying HDD and SD memory card technologies

- **New Pillar of new technology strategy**
  - **Cell innovation strategy**: The highest picture quality, biggest recording capacity, and most powerful Network accessibility packed in Cell TV (planned to be introduced from 2009 autumn in Japan first)
    - Succession of Cell TV DNA to more ranges of REGZA TVs
    - Many developments/technologies for Cell TV will be applied to many Toshiba REGZA TVs and other visual products.
REGZA Line Up for Japan Market in 2009 Spring

6 series, 22 models were launched, including Flagship ZX8000 with LED backlight, which is the highest picture quality in REGZA history.

Technology for Engine

Power of LSI & Digital Circuit Design

Toshiba is a TV manufacture that takes advantage of its own semiconductor and digital technology.

REGZA integrates both the digital technology indispensable for creating high-quality images and the know-how to produce those high-quality images, thanks to decades of experience.

We provide TV sets which move consumers
‘metabrain’, heart of REGZA

‘metabrain’ which is the heart of REGZA has been applied for all series of REGZA.
All of TOSHIBA’s TV knowhow has been built-in ‘metabrain’ developed by Toshiba.
High picture quality realized by LED backlight control system

Newly developed LSI by Toshiba realizes 2 Mil : 1 Dynamic Contrast by the fine control of LED backlight subject to the video content.

LED backlight control system unit

Conventional ZX8000

LED backlight is accurately controlled by a block. Additionally, accurate video processing, subject to the LED lighting condition, realizes high quality picture reproduction.
**LED backlight control system**

**Improvement of motion blur and natural quality picture reproduction**

Insertion of black portion in video by turning some LEDs off realizes motion blur improvement and natural quality picture reproduction.

- **Conventional 120Hz**
  - Holding
  - Holding
  - Holding

- **ZX8000 W-scan 120Hz**
  - ClearScan240


**What is Super resolution technology?**

Technology of restoring image by increasing image elements which have primary luminosity

- **Primary Luminance Change of Object**
  - Location
  - Sampling

  - Simple simulation of signal makes smooth wave form signal
  - Possible to restore the original signal bulges and dents

  - Original source
  - Conventional
  - Super resolution
Resolution+ (New super resolution technology)

Reconstruction type of super resolution technology (Concept)

Input image

Up converted

Detect differentials

Output image

Image converted to 1920x1080

Down converted (Imaging model function)

1920x1080

Coming closer to the ideal condition

1920x1080

1440x1080

1440x1080

Actual photo of 1440×1080 resolution content
(Close-up picture taken by using actual REGZA)

Resolution+ OFF

Resolution+ ON
Omakase function
(Environmetally friendly type of automatic picture setting function)

Automatic picture setting according to viewing surroundings and content useful for high quality picture and environmentally friendly

- to be vivid picture setting
- to be not too bright
- to be suitable setting for movie

Real time detection of brightness in the room, the kind of light, sunrise/sunset time movement depends on the season and the kind of content
Automatic picture setting of brightness, color temperature, tint, sharpness, etc.

Suitable picture settings are adjusted automatically
Detecting viewing surroundings
Color temperature setting is adjusted automatically according to sunrise/sunset time and color temperature in the room.

Detecting brightness in the room
Suitable picture settings are automatically adjusted according to the room brightness detected by brightness sensor.

Analyzing content
Suitable picture settings are automatically adjusted by detecting video material or film and analyzing histogram.

REGZA detects even sunrise/sunset time where the TV is placed. Suitable picture settings are adjusted automatically.

Environmentally friendly type of automatic picture setting function

Adjusted color temperature setting between daytime and night time considering human vision adaptation capability:

- In case of daytime brightness (color temp. on wall: approx. 6,000K)
- In case of bulb light brightness (color temp. on wall: approx. 3,200K)

Viewer feels natural when color temperature setting is adjusted according to the color temperature on the wall behind TV.
What is “CELL REGZA TV”? 

This is just what Future TV should be.

The top of Toshiba TV Technology
beyond REGZA
It’s the “Absolute”

CELL TV will realize
Ultra High Speed Processing & Recording
State of the Art Picture Quality
& Seamless Network Technology

All of what you want come true in 2009 autumn.
What is “CELL REGZA TV”?  

Cell, formal name “Cell Broadband Engine” was jointly developed by Toshiba, Sony and IBM. Sony is using it as a CPU for PlayStation 3. Its processing speed is 80 times faster than '08 Regza.

Cell has a heterogeneous multi-core architecture of nine core processors optimized for “Multitasking and Real-Time Processing”. It is the key device in the next generation broadband era to manage rich digital media and video stream distributed on network.

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Super Resolution Technology by Cell processor

- Super Resolution for DVD/Digital TV
- Super Resolution for low resolution web video
- Super Resolution for 4k2k (future)
**The Highest Video Recording Capability**

**“Simul-Recording of several Channels”**
Record everything you want by the giant HDD and Cell platform

**“Stress Free Smooth Access & Operation”**
Ultra high speed operation by the technology of scene detection, program storage

**“3D Graphic User Interface”**
Extremely ergonomic operation by new GUI design by Cell platform

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**The Ubiquitous World by Powerful Internet Accessibility**

Enjoy millions of Entertainment Choices from, not only, TV broadcasting or DVD but also from WEB Video, recorded contents in PC, HDD, Media cards, etc. by high-speed access technology to the Internet.
These are the demonstrations on the show.

END

Thank you for your attention