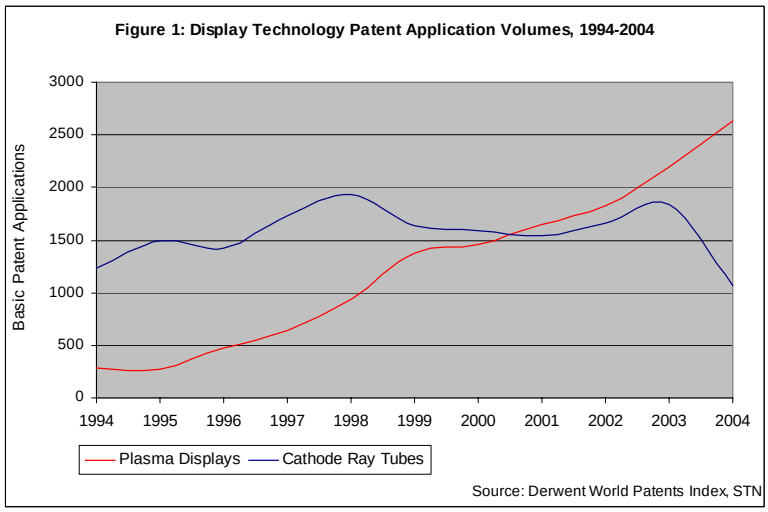
Plasma Display Panels innovation searches with Manual Codes

Plasma Display Panels – the story so far

Over the last 5 years, flat panel display technology patenting has seen immense growth *(see Figure 1)*. Consumer pressures on the market such as the drive for smaller footprint screens in the computer monitor market, to free-up valuable desk space for the user, and the huge demand for large-screen televisions with shallow depth, are largely responsible for the increase.



Both of these consumer trends have proven challenging to display manufacturers. Traditional cathode ray tube technology (CRT) cannot meet these two market requirements as the larger the screen becomes, the further away the CRT's electron guns have to be placed.

Several new technologies have emerged to address this problem. The main (and cheaper) option is 'active matrix thin film transistor liquid crystal display'. The other is plasma display panel (PDP) technology - an offshoot of neon signs and fluorescent lamps.

PDPs consist of millions of individual cells, each containing a small amount of gas across which an electric current is passed, like a miniature lightning bolt. As with lightning, the color of light produced is determined by the type of gas present. To make up a pixel, red, green, and blue gas cells are lined up next to each other in a repeating pattern all across the panel, which is then used to display an image.

Originally, PDPs used electrodes inside miniature cells to induce "breakdown", or a spark. Once this breakdown occurred, a continually applied voltage maintained the glow of the gas. Plasma is a very reactive form of ionized gas - it has high temperatures and corrodes the vulnerable metal of the DC electrodes inside the cell, decreasing the lifetime of the display. Designers had to limit the reactivity, and therefore the brightness, of the plasma to keep the display operating.

A switch from DC to AC electrodes meant that the electrodes could be coated in a protective layer of material, allowing the plasmas to be lit with much higher energies, making them much brighter.

Information - the key to innovation

PDP technology, however, is not without its problems. The fiddly nature of filling pixel-sized tubes with sensitive gases makes them expensive and difficult to manufacture. This is reflected in their high consumer price tag. Large voltages are required to induce the plasma discharge required to light up the pixels, meaning more power is needed, and as a result more heat is released from

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the back of the display panel. Also, the very nature of the display means that it has just half the expected lifetime of LCD screens. As a result, manufacturers are extremely interested in any technology that can reduce the manufacturing costs, whilst at the same time increasing the lifetime, quality and brightness of the display. For them, information about the latest innovations in this area is key—making patent information invaluable.

A key innovation in PDP technology is the switch from using multiple gases to a single gas. This produces light in the UV part of the spectrum, with a red, green or blue phosphor (which can be printed) to make up the pixel, making the panels much simpler to manufacture. The cost savings from this alone can drop the price tag by $1,700 per panel.

Innovation searching easier with Manual Codes

Manual Codes are important to use when searching *Derwent World Patents Index*® (*DWPI*®) because they cover both the novel technical details disclosed within the patent, and the invention's application. They enable an extra level of precision and accuracy that isn't possible by using International Patent Classification codes (IPCs) alone.

Over 40 Manual Codes covering PDPs were introduced to *DWPI* in the 1992 revision of codes. More codes were later introduced to cover the increasing use of "trigger" and "sustain" electrodes, i.e. two pairs of electrodes in each cell, one to initially create the lightning spark and another lower power, set to maintain the glow.

In early 2005, with input from our customers, we again revised our codes, ensuring that the latest technological developments were reflected in our database. Over 1,000 new codes were added to the engineering sections alone. For example, new codes were added to specifically cover the novel manufacture of PDP electrodes (V05-L01B6) and novel phosphor compositions specifically for PDPs (V05-A01B3). We also changed the structure to accommodate the fact that most PDPs now use UV light acting on a phosphor to produce red, green and blue light.

Searching for patent information on PDPs, solely using the International Patent Classification (IPC) H01J-11 or H01J-17, covering the AC type PDP described above, will return very broad results, as there are no IPCs to cover specific PDP details, such as seals, housings, coatings, drive circuitry etc. Using both the IPC codes and the Manual Codes for a specific aspect of PDP technology will return a much narrower result set, helping you to focus in on the information that you need.

Manual Codes for PDPs are now structured as follows:

V05-A01 - Plasma display panels and tubes
- ↳ V05-A01A - Characterized by type of display
  - ↳ V05-A01A1 - Segment type display tube
  - ↳ V05-A01A3 - Plasma display panels
    - ↳ V05-A01A3A - DC display
    - ↳ V05-A01A3B - AC display
  - ↳ V05-A01A7 - Combined technology displays e.g. Plasma Addressed LCD
    - ↳ V05-A01A7B - Using plasma as source of electrons
  - ↳ V05-A01A9 - Other types of plasma display
- ↳ V05-A01B - Light emitting arrangements
  - ↳ V05-A01B1 - Gas filling
    - ↳ V05-A01B1A - Gas filling additives

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- V05-A01B1C - With several separate gases
- V05-A01B3 - Phosphor Compositions
- V05-A01B5 - Phosphor arrangements

V05-A01C - Electrode assemblies
- V05-A01C1 - Anodes
- V05-A01C2 - Discharge triggering and maintaining electrodes
  - V05-A01C2A - Discharge triggering electrodes
  - V05-A01C2C - Discharge maintaining electrodes
- V05-A01C3 - Cathodes
  - V05-A01C3A - Heated cathode
- V05-A01C4 - Micro-fabricated electrodes
- V05-A01C5 - Electrode supports
- V05-A01C7 - Dielectric coatings

V05-A01D - Vessels, spacers, cell construction
- V05-A01D1 - Vessels per se
  - V05-A01D1A - Seals
  - V05-A01D1C - Conductive coatings
  - V05-A01D1E - Optical coatings
- V05-A01D3 - Internal spacing elements and seals
  - V05-A01D3A - Internal seals
- V05-A01D5 - Lead-in conductors
- V05-A01D7 - Mounting of integral drive circuitry

V05-A01E - Complete novel display device

V05-A01F - Module aspects
- V05-A01F1 - Optical filter
- V05-A01F3 - Housing, screening
- V05-A01F5 - Drive circuitry pcb mounting; connectors

V05-A01G - Drive circuitry (circuit details)
- V05-A01G1 - Integral with display

For more information about Manual Codes, go to:
www.scientific.thomson.com/support/patents/dwpiref/reftools/classification/code-revision/

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