

SHARP



Nothing is lost
with FULL-HD AQUOS

SPECIAL REPORT by **cleverdis**
information intelligence



HANS KLEIS

CEO – Sharp Electronics Europe

FULL-HD IS HERE

Europe, for two years now, has been ahead of Japan as being the largest market for LCD TVs in the world. In this candid interview, Hans Kleis, CEO of Sharp Europe, explains why he believes his company is heading for dizzy new heights in the field of LCD TV, further eating away market share of plasma TV ...

Hans Kleis: The market share of LCD TV has been rapidly increasing... even faster than most people had predicted, and this increase is even greater than for plasma. This is because plasma is only efficient for large models of at least 37", while LCD TVs come in many sizes for a variety of applications. My belief is that LCD TVs will continue to increase their market share in Europe, exceeding 50% in 2007 and becoming the main player in the TV market, while the primary screen size will shift from 30 to 40 inches.

How is Sharp catering for the big increase in demand?

The crystallization of Sharp's LCD technology and TV technology has come thanks to the opening in January 2004 of the most advanced facility for the integrated production of AQUOS – from the manufacturing of LCD panels to assembly of final products – in Kameyama, Japan. In October 2006, the second plant is scheduled to

start operation. As a result of a massive rise in demand earlier this year, production capacity at Kameyama I has been increased by 20 percent, thanks to an investment of 105 million Euros. In addition, the original investment planned in the ultra-modern plant, Kameyama II is being raised by 1.1 billion Euros to 2.5 billion. Thanks to Kameyama II, we will occupy an exceptional position in the all-decisive year-end business, particularly in the FULL-HD market segment and large-format panels of 40 inches and larger. Kameyama II is the only plant that will be able to produce 90,000 mother glass sheets per month by the end of 2008! This is equivalent to 720,000 46-inch panels (one mother glass makes 8 x 46 inch panels).

Apart from being a fully integrated TV production plant, we understand that Sharp is very proud of Kameyama's environmental record...

The plant is unique in the world in that respect. A cogeneration system and photovoltaic power generating system supply the plant with about one-third of the energy needed in-house and thus together with using exhaust heat, the plant reduces CO₂ emissions by about 40% compared with conventional models. In addition, the plant collects all the waste water from the production process and recycles it with water purification technology.

So from what we can see, Sharp is working very hard at being the "Green Minded" TV manufacturer... Can you tell us more about this dedication to the environment?

Yes... Alongside the highest possible standard for our products, the protection and conservation of the environment is indeed an equally important concern to us. Based upon this awareness, Sharp Corporation operates a consistent environmental strategy that systematically realises responsible dealings with our natural environment in the whole company worldwide. The urgent ecological problems, in particular global warming, pose major challenges to humanity which can only be met with care and determination. Many Sharp products now have national and international environmental labels. The Sharp AQUOS models which are manufactured in Spain were honoured by the EU Commission for compliance with comprehensive ecological criteria. In addition, in 2005, SH1E series TV's by Sharp were the first to receive the EU Eco-label. This relates among other things to particularly low energy consumption, compared to conventional TVs in standby and during operation, the recycling-friendly design and the selection of environmentally sound materials. But as Sharp is resolutely pursuing its aim to meet high ecological standards, numerous other Eco-Labelled LCD TVs have followed (eds. See page 14 for details). Presently Sharp is the only manufacturer of EU Eco-Label certified television sets.

Sharp last year announced production of 65" high-definition LCD TVs... the biggest-screen LCD TVs yet announced. Tell us about this new flagship model.

The LC-65GE1 AQUOS TV measures 65 inches across the diagonal and can display a full HD picture with 1,920 pixels by 1,080 pixels of resolution. The screen has a 16:9 aspect ratio, a brightness of 450 candela per square meter and a viewing angle of 170 degrees. We will be making about 300 units per month for the domestic market and between 1,000 and 2,000 per month for the international market.

What are the main trends for your TV line-up?

We will be expanding the line-up and selling more models with bigger screens. Most LCD TVs sold by Sharp are in the 30-inch range, but we intend to have a line-up of LCD TVs with screen sizes in the 50-inch to 59-inch range on sale in Japan and internationally within the year. We are very pleased to announce the launch in Europe of two new flagship models – the LC-46XD1E and LC-52XD1E. These 46 inch and 52 inch Full High Definition models are the next

step in making premium large screen LCD TVs more commonplace in European homes.

So "FULL-HD" is going to be important in the market?

Yes. For the moment, there is a big education job going on, with people learning about "HD-Ready". This refers to resolution levels that are either 720p or 1080i (eds: Explanation later in this Special Report). FULL-HD refers to TV's that have a minimum of 1080p resolution - meaning in fact that there are twice as many pixels on the screen as an HD-Ready TV. As screen sizes get bigger, people will increasingly notice the difference between HD Ready sets and FULL-HD sets. This will become an important factor for buyers as they become more aware of the breath-taking images that can be delivered by such technology... Even more breath-taking than HD Ready!

Sharp, as you mentioned before, is destined for new summits in terms of TV sets sold, however the simple fact of increasing sales is not the core philosophy of Sharp...

No. We do not seek merely to expand our business volume. Rather, we are dedicated to the use of our unique, innovative technology to contribute to the culture, benefits, and welfare of people throughout the world. Our future prosperity is directly linked to the prosperity of our customers, dealers, and shareholders... indeed, the entire Sharp family.

... So what you're saying is that a commitment to certain ideals is important for you?

That's the best way of putting it. Sharp's business creed is "Sincerity and Creativity". We believe that by committing ourselves to these ideals, we can derive genuine satisfaction from our work, while making a meaningful contribution to society.

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HD MINI EUROPE

Advantages of LCD in HDTV

Industry pundits agree that there are 3 main forces driving the changes in the world TV market at the moment:

- The availability of large flat panel displays at descending price points
- The switch from analogue to digital
- The introduction of HDTV

LCD will Dominate

According to Bob Raikes of TV Market Analysts "Meko", LCD TV will be the biggest selling flat panel technology in Europe in the future, partly because of the wide range of sizes that use the technology. PDP, in contrast will only be strong in the TV market in the size range of 50" and above in the near future.

The analysis is easy, coming down to two main factors. On the one hand, plasma manufacturers only manufacture plasma for TVs and professional displays of sizes generally ranging from around 40" to 60". They're not used for anything else, meaning the number produced each year depends entirely on the sale of TVs of this size. In other words we are talking about around a few million units in 2006.

On the other hand, LCD technology is becoming increasingly present in our daily lives, with panels of all sizes all around us – in the car, in every room of the home... even in hotel lifts. The overall market for LCD panels is estimated at somewhere around a billion units. Consequently, research and development and economies of scale correspond in their enormity. We have arrived at generation 6 and 7 factories for LCD, meaning the size of the glass area allows for greater efficiencies, as 8 x 40 inch LCD TV screens can be cut from the same substrate. With the completion of Sharp's Gen. 8 factory, this will add to the impetus of LCD in the larger size flat TV market.

HDTV in Europe

As potential buyers see more and more HD images on TVs in stores, they will be increasingly attracted to buy HD-Ready equipment and ensuring they have HD sources. There has been a vicious circle in the past. People have not bought HDTVs because few channels were broadcasting in HDTV. Broadcasters have not been broadcasting in HD because not only did viewers not have HD capable TVs, there were also no programmes available, and equipment was expensive. All these factors are changing at the same time. The prime mover is the fact that HD-Ready TVs are

becoming the norm, and in a couple of years, channels not broadcasting in HD will be like those continuing to broadcast in black and white after the colour change-over.

Europe's HDTV Beginnings

After the launch of Europe's first HD satellite service - Euro 1080 in 2004, a number of countries in Europe are now starting to roll out HDTV services. Germany's ProSiebenSat1 Group was the first national TV corporation in Europe to use the new high-resolution format, with its two channels broadcasting in HDTV alongside the standard format. Both HD stations started broadcasting on October 26, 2005, via the ASTRA satellite system.

Did you know?

While many people enjoyed watching the 2006 World Cup in HDTV, did you know that the first test broadcast of a World Cup Match in HDTV was undertaken in 1998, during the World Cup in France, when Germany's Dierk's Studios made a test transmission in full HDTV from Marseille's "Stade Velodrome"?



HDTV ROLL-OUT

According to Pacome Revillon, Managing Director, Euroconsult, "...penetration of HDTV sets should reach 20% of European households in 2010, and close to 10 million households may subscribe to HDTV services at that time..." According to Euroconsult, the multiplication of HDTV channels, the introduction of HD DVD players and the development of standards such as the HD Ready label are all instrumental in the adoption of HDTV by TV viewers.

"Germany is currently the most dynamic high definition market from the supply side," says Revillon. Following the launch of two HD channels by ProSiebenSat.1, the pay-TV platform Premiere also introduced a package of three HDTV channels. The development of the German HDTV market will be favoured by the low penetration of terrestrial TV reception, with more than 95% of households receiving TV through satellite and cable. HDTV market drivers include 43% of TV reception by satellite, currently the most flexible delivery network for HDTV. The push of Premiere, that has reached a critical size with close to 3.5 million subscribers, will also be instrumental in the development of high definition. Of course, the World Cup was a strong opportunity to promote the HDTV experience and to increase the viewers' interest. The German market is expected to continue to have the largest number of households equipped with HDTV sets over the next ten years.



What Exactly is HDTV?

HDTV is high-resolution digital television (DTV) combined with Dolby Digital surround sound. HDTV is the highest DTV resolution in the new set of standards. This combination creates a breath-taking image with thunderous sound. HDTV requires new production and transmission equipment at the HDTV stations, as well as new equipment for reception by the consumer. The higher resolution picture is the main selling point for HDTV. Imagine 720 or 1080 lines of resolution compared to the 625 lines people have been used to in Europe – it's a huge difference!

The formats used in HDTV are:

720p – 1280x720 pixels progressive

1080i – 1920x1080 pixels interlaced

1080p – 1920x1080 pixels progressive

"Interlaced" or "progressive" refers to the scanning system. In an interlaced format, the screen shows every odd line at one scan of the screen, and then follows that up with the even lines in a second scan. Since there are 30 frames shown per second, the screen shows one half of the frame every sixtieth of a second. For smaller screens, this is less noticeable. As screens get larger, the problem with interlacing is flicker.

Progressive scanning shows the whole picture, every line in one showing, every sixtieth of a second. This provides for a much smoother picture, but uses slightly more bandwidth.

"HD Ready":

When you see TVs that are labelled "HD Ready", this essentially means the TV can receive and display signals in 720p format (also 1080i). But remember that buying the TV alone won't bring you HDTV pictures. You will also need to obtain an HDTV digital set-top box. Similar to a cable box, this is a tuner that receives the broadcast in digital form and feeds it to your TV.

FULL-HD and LCD – When Only The Best Will Do...

FULL-HD refers to 1920:1080 progressive scan format. It gives you around two times the number of visible pixels of an HD-Ready TV. The result is especially noticeable on bigger screens. The way LCD is made, it's a lot easier to produce "FULL-HD" than with plasma. In the next few years, "FULL-HD" will become increasingly known as the "only way to go" for people wanting the best picture available. This is where LCD will really shine. Speaking of shining, don't forget that LCD screens are much brighter than plasma, so if you have a room that has high ambient light conditions, and you want to watch HDTV, LCD is the best bet.

WHAT'S IMPORTANT

when choosing a new TV

Farewell to the "box"... Hello "slim-line" screens that can be hung on the wall or sit on a bookshelf. The arrival of flat screen TV has transformed the home entertainment world. Henceforth, a modern TV screen is flat... and "design conscious". Bid farewell to the cumbersome "box".

HOW DO I CHOOSE?

How Big?

Image size generally goes with room size. The most important thing to keep in mind is how the TV will fit aesthetically into the room, and how much space there is between the viewing position and the TV. Thanks to flat screen TV's, one can now go for a larger sized screen than in the old days of CRT. Why? There are two reasons. The first is that thanks to the thin form factor of the LCD TV, it's easier to put it closer to the wall, or even hang it on the wall. In addition, the main hindrance to getting too close to a big screen is what's known in the business as "visual acuity", which means that within a certain distance, one could start to define the tiny dots on the screen (pixels). Now that HDTV has arrived, this is less of a problem, as the dots are a lot smaller. This means that from the same distance as an old Cathode Ray TV you can now place an HDTV screen that is around 1/3 bigger... or in the case of a FULL-HD screen, even bigger still, without getting dots in front of your eyes. Generally bigger is better. Have you ever heard anyone complaining that they wished they had a smaller TV?

Calculating

If you're not sure which screen size is best for your room size, use the following guidelines. From where the viewer is seated, calculate a distance of 3 to 5 times the width (horizontal size – not the screen size, which expressed as a diagonal) for good visual comfort.

Resolution Explained

As most people know, the picture on a TV screen is made up of tiny dots, called "pixels". The dots on normal, standard definition (PAL/Secam) TV's are a lot bigger than on High Definition TV's, so there are far fewer of them on the screen. Visual comfort comes at the point where you are far enough away from the screen that you can't see the dots – that the picture is nice and "smooth". As there are more pixels on High Definition (HD) TV's (up to 6,2 million), you can have a screen that's almost a third bigger than a standard definition screen for the same seating distance. This is why "resolution" is important to understand. When you hear people in stores talking about horizontal and vertical resolution, they are in fact talking about the number of dots (pixels) either across the screen or on the vertical axis. The more you raise the resolution, the more dots there are on the screen. Just remember that High Definition TV sets have many more dots on the screen... meaning the picture has a lot more detail and is easier to watch.

Brightness and Contrast

A combination of brightness and contrast influences the visual impact of the screen. Associated with the clarity of the image, high contrast makes it possible to better distinguish details. However, beware of the spec sheets! What's published by the manufacturers only corresponds to contrast levels in "ideal" situations (i.e. a pitch-black room). Thus, while Plasma screens tend to dominate in terms of published specs compared to LCD, the contrast of plasma falls faster than LCD as the ambient light increases. This means that in a room with normal daylight conditions, an LCD screen will often have better real contrast than the Plasma.

Colour

It's important to look for colours that look real, not a picture where the colours are on the one hand washed-out, or on





the other hand, over-bright. Ideally, watching your TV screen should give you the impression of looking through a window. It should look so real that you are sitting in the middle of the picture – part of an experience... It is thus very important to verify that the colour on the screen is as “real” as possible. Look at various pictures from a single source and try to look for things like skin tones, and things to which you have subliminal references, such as food or plants etc. Some TV's have very bright colours, but this is not what to look for. The key word here is “real”.

Image processing

The quality of the LCD or Plasma panel only assures the final quality of the image, but does not guarantee its overall quality. You may have heard about the computing term “GIGO” – meaning “garbage in – garbage out”... The same goes for TV sets. The picture on the screen depends a lot on the signal that is being fed to it, which may be coming from one of a number of sources – a terrestrial TV antenna,

a satellite decoder, a cable set-top box, a DVD, a VCR or even today from internet sources (called IPTV).

The quality of these signals varies in some cases greatly and when you put a poor signal into a TV set – the result will be disappointing on the screen. This is even more so for LCD and plasma TV's because they are digital – meaning that each individual pixel (or dot) on the screen is in fact addressed individually, rather than with analogue TV's, where blurry signals looked... well... blurry. With digital TV's blurry pictures just look yucky... as the electronics at the heart of the set don't know how to deal with things that are not totally clear-cut. This is where image processing comes in. All digital TVs have some kind of image processors that take various kinds of signals and make them into something that looks reasonable on the screen. It's the electronics between the input or tuner device and the actual screen itself and it's often this electronic gear that really makes a difference. With exactly the same input, and exactly the same LCD panel, two TVs can have a totally different picture, thanks to different qualities of image processing.

LCD – IT'S EVERYWHERE

LCD has come a long way in the past few years ...



LCD Technology was pioneered by Sharp more than 30 years ago, with the release of the first LCD pocket calculator in 1973. The company has since become synonymous with LCD Technology. LCD is the only technology available today that (still) caters for sizes of just a few centimetres (calculators, phones, digital still and video cameras, in-car use, etc.), passing by medium sized screens (PC's, Portable TV's, etc.) right up to large flat screen TV's. We first noticed the true onset a few years ago, as LCD monitors started to become commonplace in the office, and then at home. But in the consumer sector, the inclusion of LCD TV's is still a relatively recent phenomenon, whose popularity has been caused by a marked drop in prices, thanks to new economies of scale in LCD production. Today, LCD is almost omnipresent, facilitating our daily lives in ways we never would have dreamt about even just a few years ago. And Europe is at the heart of this change in paradigm, with consumers finding it easy to integrate LCD TV's into virtually any room in the home.

SHARP WINS ENGINEERING EMMY

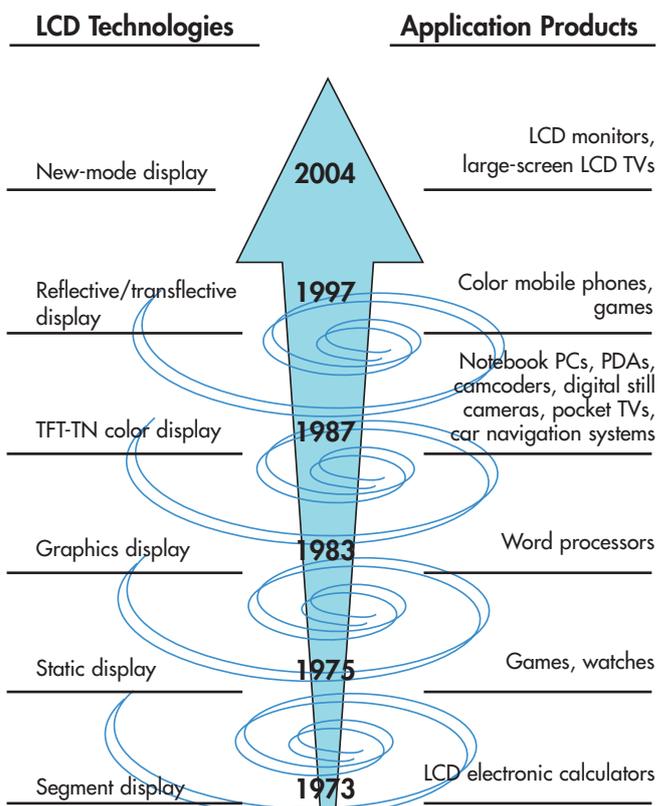
In November 2004, The National Television Academy awarded a Technology and Engineering Emmy Award to Sharp for its development of Direct View Liquid Crystal Display Screens. Launched in 1948, the Emmys recognise companies, organisations and individuals for breakthroughs in technology that have a significant effect on television engineering. According to Peter O. Price, President of the National Television Academy, "Our long tradition of recognizing technology in television honours both the science of the medium as well as the applications which are now expanding the universe of our profession."

David becomes Goliath...

While having its roots in the smallest LCD displays – calculators and watches – Sharp recently decided to push LCD technology to its limits, creating the biggest LCD TV on the market – bigger than most of the Plasma TV's you'll find in the shops today... a 65" LCD TV! The new 65" LC-65GD1E features a full-spec high-definition LCD panel with resolution of 1,920 H x 1,080 V pixels that can precisely display digital content in "true" high definition format (1080 lines).

In addition to outstanding features deriving from its high-resolution, low-reflection Advanced Super View LCD panel, the LC-65GD1E incorporates a newly developed Four-Wavelength back light that adds the wavelengths of "crimson" to blue, green and red for faithful reproduction of pure red colours.

The TV's High-Aperture Speaker System features a detachable speaker grill and the highly rated 1-Bit Digital Amplifier delivers clear natural, high-resolution sound to complement the equally impressive picture performance. The LC-65GD1E also incorporates a built-in iDTV Freeview



tuner and is supplied with a separate AV centre that houses a convenient PC card slot in addition to the many inputs and outputs including component / RGB and DV-I (HDCP).

New! Sharp Launches 46 and 52 inch FULL-HD TVs at IFA 2006

With a list of features as long as the list of red and yellow cards dealt-out in the Portugal-Holland match in the World Cup, Sharp's two new FULL-HD TV's - the LC-46XD1E and LC-52XD1E, launched at IFA, will set new standards of image quality for the category.

Apart from being doted with 1920 x 1080 pixel LCD panels, a few of the main features include high brightness (450cd/m²) and high contrast ratio (2500:1), "Quick shoot technology" - providing clean clear reproduction of high speed moving images. The new models have a response time of only 6 ms, a 176° viewing angle and dispose of a built-

in DVB-terrestrial tuner and Sharp's new four-wavelength backlight system to deliver more natural reds. The sets are equipped with extremely sophisticated integrated Hi-Fi surround sound and NICAM/A2 Stereo systems, which among other things automatically differentiate voices and music to deliver clearer voices, and have a volume equalizing system, levelling out the volume from various sound sources. In terms of interfacing, these new units have advanced digital interfaces with 2 HDMI inputs.

Environmentally conscious

Continuing along the lines of Sharp's "Green TV Manufacturer" policy, these sets have an OPC function, which automatically adjusts the screen luminance according to room brightness or lighting conditions, thus reducing power consumption, and are equipped with long-life backlights and eco-oriented materials and design, convenient for recycling.



LC-52XD1E





DIFFERENTIATION

through variety

Rather than catering for just one market segment, Sharp sets itself apart through its full coverage of all sectors. Their range begins with small screen TVs and “lower” definition LCD panels – as a counter-current to the race for more and more pixels. This wager has been an intelligent one ... backed with solid reasoning.

PAL / SECAM – No Compromise

PAL optimal

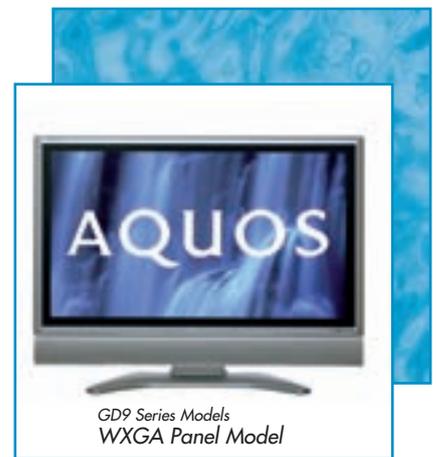
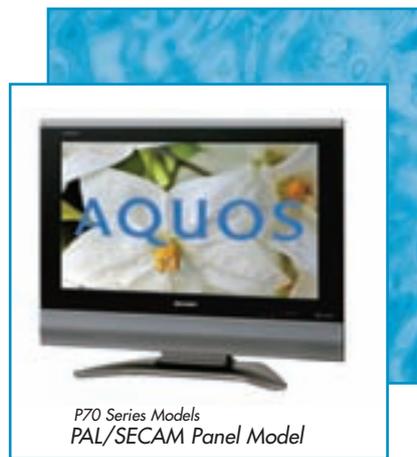
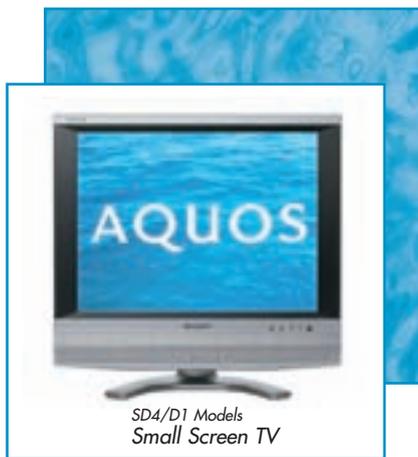
ppp

Targeting the large swathe of the European public who are looking to buy a flat panel television for the first time, the AQUOS P50 series is the world's first LCD TV specifically designed for the European standard PAL & Secam signals. Until 2005, the only choice has been between the awkward compromises of a VGA (640 x 480) resolution set which strips out some of the signal's lines, or a WXGA (1366 x 768) screen which uses processing circuitry to interpolate the extra lines required. Neither is totally satisfactory, but no flat panel manufacturer had ever solved the problem by manufacturing a screen which reproduces a PAL signal perfectly – until the P50. With its 960 x 540 resolution

reproducing a PAL broadcast exactly, line for line. Sharp's P50 series and its successors, the P55 and P70 AQUOS LCD TVs are the only flat panel televisions designed solely for the European market. The LCD panel also incorporates Sharp's unique Advanced Super View (ASV) technology to enhance picture quality still further, with brightness at 450cd/m² and a contrast ratio of 800:1. A response time of 12ms ensures there's no smearing when watching fast-moving images such as sport, whilst viewing angle is 170°.

Small can be beautiful

Retaining a solid base in the realms of “small screen” TVs, Sharp has several 20” (4:3 format) models, one of which has a built-in DVB-T (digital TV) tuner. These TV's boast High brightness (430cd/m²) and a contrast ratio of 500:1. Flicker-free, low reflection screens reduce eyestrain, allowing for longer viewing without fatigue and sound quality is assured with surround sound and NiCAM/A2 stereo. Like many other sets produced by Sharp, these will appeal to the environmentally conscious among us, as they are equipped with long-life backlight and eco-oriented materials and design convenient for recycling.



WXGA – HD Ready

As Europe moves resolutely into the era of High Definition TV, the minimum requirement for anyone wishing to take advantage of HDTV broadcasts or recordings is known as WXGA. This equates to a panel containing 1,366 x 768 pixels. Viewing angle has been further improved thanks to the use of new LCD technology, giving 176° angle, ensuring no loss of picture quality for those sitting “on the sidelines”. New LCD technology also means ultra-fast response times – with an announced rate of 6 milliseconds. This means that even the fastest moving images will be free of blurring effects. AQUOS WXGA TVs boast high brightness – 450cd/m² and a very high contrast ratio – 1200:1. Again, sound is a very important element to “putting people in the picture”, with the inclusion of surround sound and NiCAM/A2 stereo, with a clear flat speaker which produces no phase deviation. Auto volume controls equalize volume levels of programmes from various sound sources, and “clear voice” automatically differentiates voices and music to deliver clearer voices.

FULL-HD – When only the best will do...

According to various analysts, in the market for 40-inch and larger Flat Screen TVs, FULL-HD TVs (with a resolution of 1920x1080) are likely to emerge as the mainstream in the coming years, taking more than 50% of the market by 2010. FULL-HD essentially gives you 6,2 million pixels (or “MegaPixels”) as opposed to 3,1 million on a WXGA (HD Ready) screen. Why is this important? Basically, because many new sources will be able to deliver 2 megapixel content, and when one sees the result on the screen, there's no turning back! One of the most blatant examples is the increasing interest in displaying high definition digital photos in slide shows on the TV. In addition to having similar specs to the HD Ready models in terms of response time, contrast and brightness, these models are equipped with a new four-wavelength backlight system to deliver natural, pure reds. They also include a 1-bit digital amplifier which reproduces high-resolution sound and Virtual Dolby Surround & NiCAM/A2 stereo.

Environmentally conscious

The OPC function on all of Sharp's HD Ready sets automatically adjusts the screen luminance according to room brightness or lighting conditions, as well as reducing power consumption. Long-life backlight and eco-oriented materials and design make these models environmentally advanced.

Digital or Analogue? No problem

With the onset of Digital TV throughout Europe, it may be important for you to have a built-in digital tuner, avoiding the necessity of adding an external digital tuner box. On the other hand, if this is not a priority, Sharp also has a full range of models with analogue tuners. As most models are equipped with HDMi connectivity, high resolution images are easily able to be displayed from any source with an HDMi output.

Full AQUOS product brochures are available from Sharp on demand.



ABOUT LCD TECHNOLOGY

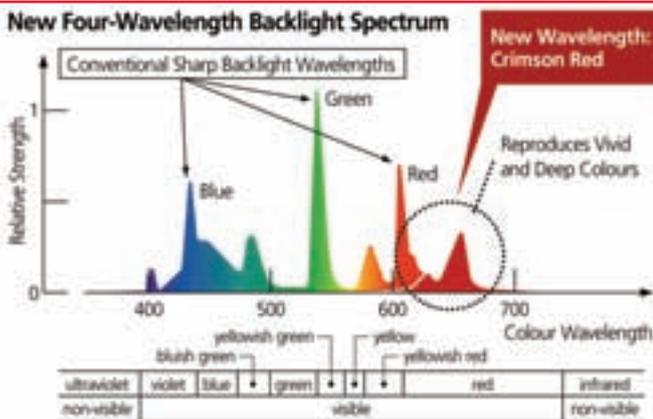
how does it work?

Advantages of LCD

LCD has a number of major advantages with regard to plasma. To begin with, LCD is much lighter, meaning the average person can easily carry an LCD TV or monitor from one room to another. In this day and age, where power consumption is a major issue, it's important to note that LCD has lower power consumption and lower heat emission, which means no fan is needed and saves air conditioning costs. As HDTV becomes increasingly attractive, with more and more channels coming on line, LCD will gain further ground, because it's easier to attain higher resolutions, particularly full HD resolution (1920 X 1080). If you want to use a TV or monitor in strong ambient light conditions, LCD is by far and away the best choice. There's higher "real-life" contrast, as LCD displays are less affected by ambient light than plasma displays.

Backlight **RGB PLUS**

While cathode ray and plasma technologies rely on phosphors that are excited by electrons – which makes them light up, the light in an LCD screen is provided by a backlight, meaning that if the backlight is brighter, the screen will consequently also be brighter. In some of the bigger screens there may be several backlights. The reason why an LCD TV generally didn't have as good a colour gamut as CRT screens until now was due to the light originating from the back light not necessarily having the spectrum necessary. The new Four-Wavelength Backlight Spectrum used by Sharp gets around the problem of having poor colour gamut – especially in the reds, by adding a new wavelength.



Sharp's Kameyama Factory – World's First Generation 8 Plant

The Kameyama plant is the only place in the world with a manufacturing set-up that incorporates both LCD and TV production. According to Sharp, the great advantage of having LCD and TV engineers working in the same factory is that they can then easily meet and discuss technological issues. This makes it possible to produce LCD panels constructed to an optimised TV specifications, and to design TV circuits and image-processing device that make best use of the advantages of LCD panels, involving the amalgamation of the skills of master engineers from two different fields.

The Kameyama plant II produces large LCD panels by using the world's largest (8th generation) mother glass, which measures 5.31 m² in area and 0.7 mm in thickness, and which is 2000 times smoother than normal glass. The liquid crystals are slotted into a 3-micrometer gap between the two layers of glass.



COMMENT

on Sharp & flat TV market



by Ross Young
Founder & President
DisplaySearch



Over past years, Sharp, as inventor of the LCD TV has dominated the LCD market. How do you see Sharp's position going over coming years given the increased competition in the field?

Sharp is still number one in Japan and is one of the leading brands in the US and Europe. What makes them unique relative to their competitors is that they focus on all sizes, with products ranging from 20 inches to 65 inches, and they try to be the leading edge in terms of resolution. They were the first major brand with a 1080p product. But at the same time they're offering a more accessible lower-resolution product as well. They even have a PAL specific product in Europe, and they still sell a lot of VGA products. So they try to be a full service provider, servicing the whole market as opposed to focussing on just the high end like some of the other brands.

What do you feel will be the result of the opening of Sharp's Generation 8 Kameyama plant in Japan?

I think the opening of the plant will help Sharp close the gap on the Koreans who for some time have had a supply advantage with their Gen 7 fabs. It will be hard to match the success the Koreans have had in the 40" space, but Sharp is in a good position to lead in the next large size categories which will be 46" and then 52". The larger fabs have resulted in dramatic price cuts in larger size TV's and Sharp is taking that to the next level by being the first 8th generation supplier.

Plasma manufacturers have not been standing still as LCD has been progressing. How do you see LCD positioning itself against plasma?

LCD already has around a third of the market in the 42" space due to the increased cost efficiency of the generation 7 fabs. As more capacity comes on line optimised for larger panels, we think eventually 40-42 inch LCD will overtake plasma. By 2008, we think there will be quite a bit more 40" optimised capacity in LCDs. PDP manufacturers will focus more of their resources on 50" where there is less optimised LCD capacity and less competition. Only 8th Gen LCD factories will be able to compete with Plasma at that size.

So how would you summarise Sharp's position in the market?

I think they're going to be the leader in the larger sized TVs for quite a while. I think they'll have the strongest position in

46", 52" and even 57" and 65" and they will continue to be the leading company trying to overtake plasma in large size flat-panel TV.

What do you see as being the main advantages of LCD as opposed to Plasma?

According to measurements we've taken across the screen, LCD's are ten times brighter than Plasma. Also resolution is an advantage, which will grow in importance as more 1080p movie titles become available and Blu-Ray and HD-DVD player prices come down. We expect to see more LCD's focussing on 1080p compatible with those DVD players. There's definitely a lot of promotion for the second half of this year focussed on 1080p, and they won't involve plasma because there's no 1080p plasma available below \$4,000. So we think resolution will become of growing importance in the consumer's mind and that will favour LCD.

On a revenue basis, in the last year, LCD TVs grew more than twice as fast as competing technologies with its share rising from 18% to 32%. Including plasma TVs, flat panel TVs accounted for a majority of revenues with a 51% share, up from 33%, with CRTs falling from 51% to 38% and RPTVs falling from a 15% to an 11% share.

"Sharp is in a good position to lead in the next large size categories"



Ross Young is the founder and President of DisplaySearch. He is regularly quoted in numerous national publications including Business Week, Forbes, Fortune, New York Times, USA Today, and Wall Street Journal. Prior to founding DisplaySearch, he served in senior marketing positions at OWL Displays, Brooks Automation, Fusion Semiconductor and GCA in the driver IC, flat panel automation, etch and strip and lithography markets respectively. He authored a book on U.S.-Japan high tech competition entitled Silicon Sumo: U.S.-Japan Competition and Industrial Policy in the Semiconductor Equipment Industry, published by the University of Texas, which offered a unique perspective on U.S.-Japan competition.

DisplaySearch provides leading market research and consulting on the entire flat panel display (FPD) food chain, including component suppliers, equipment manufacturers, FPD producers, OEMs, brands, distributors and retailers.

ECO LABELS

Environmental Protection

It is important to note that at many levels, Sharp is working very hard on being known around the world as the "Green Minded" TV manufacturer. To wit, the Sharp Corporation has adopted a number of policy guidelines for an all-embracing environmental management strategy:

- To promote environmental awareness throughout the organisation
- To create environmentally advanced technologies and products
- To minimise the eco-footprint of its factories and production processes
- To environmentally optimise its logistics and packaging
- To comprehensively communicate environmental themes to its customers and partners

On this basis, Sharp Corporation claims that it is consistently pursuing the aim of shaping the future as an environmentally advanced and progressive company – aspiring to sustainable growth, and championing the protection of the environment in equal measure.

An "Environmentally Improved" Factory...

At Sharp's Kameyama plant, the most advanced technology are being employed to keep environmental impact to a minimum. A cogeneration system and photovoltaic power generating system supply the plant with about one-third of the energy needs in-house and thus together with using exhaust heat, the plant reduces CO₂ emissions by about 40% compared with conventional models.

In addition, the plant collects all the waste water from the production process and recycles it with water purification technology.

The European Eco-Label

Many Sharp products now have national and international environmental labels. Sharp's SH1 LCD TV series was the world's first generation of TVs to be awarded the EU's Eco label. Sharp has now followed on with a range of LCD TVs that all meet the ecological criteria for obtaining the EU Eco-label.

What is the European Eco-label?

The aim of manufacturing innovative products that harmonise with environmental factors is encouraged by the European Commission, and to this end, since 1992, the European Commission in co-operation with its member states, has established a certification scheme for products and services: the European Eco-label – also called the "Flower". This voluntary scheme can only be met by approx. 30% of the products per category on the market

(thus assuring that the awarded products meet strong environmental criteria). Products with the Eco-label for TVs have reduced environmental impact, due to reduced energy consumption during use and stand-by, limitation of adverse substances, designs for higher durability, easy disassembling and recycling and user information for correct environmental use.

These stringent environmental criteria are also met by the new TVs in the BV8 and GA8 series as well as the LC-20SD4E model recently launched by Sharp.

Models officially meeting Eco-Label standard:

LC-13-/15-/20-SH1E, LC-20S4E, LC-26/-32/-37P50E, LC-26/-32/-37GA6E, LC-15/-20SH2E, LC-32/-37GA9E, LC-32/-37BV9E, LC-26/-32/-37P55E, LC-20SD4E (new), LC-32GA8E, LC-32BV8E (new), LC-37GA8E, LC-37BV8E (new)

Three models in Sharp's LCD TV range receive "energy saving recommended" endorsement

Three models in Sharp's 'P70 Series' LCD TV range have been awarded the Energy Saving Trust's 'energy saving recommended endorsement' for their low energy consumption and contribution to reducing carbon dioxide emissions (CO₂). Sharp is one of the first LCD TV manufacturers to receive this certification in the UK, and the Company's accredited models are now listed on the Energy Saving Trust's web site at: www.est.org.uk/

The three EST-accredited Sharp models are:
Sharp AQUOS LC-37P70E
Sharp AQUOS LC-32P70E
Sharp AQUOS LC-26P70E

Recycling

An ever more important criterion, especially with the implementation of the European WEEE directive in the European member countries, Sharp has assured the easy dismantling of sets and the careful choice of recyclable materials to increase reusability after the usage phase of the product.



LC-37GA9E

CONCLUSION

SHARP – Giving true meaning to “Cutting Edge”

by Richard Barnes
Editor in chief
Cleverdis



LCD TV has finally come of age. This may sound a little outlandish, as LCD TV has of course been around for a while now, however we have arrived at a kind of inflection point, where for the first time, LCD is finally able to efficiently cover all the main sizes of TVs sold in Europe. Until now, the very large sized LCD screens (between 40 and 60 inches) were extremely difficult to produce “efficiently”. Sharp's Kameyama plant in Japan, producing generation 8 mother glass, circumvents this difficulty and consequently means that the large screen sector, until recently catered for only by plasma and projection devices, is henceforth also the stamping ground of LCD. In addition, it has to be noted that the biggest LCD screen sizes (over

60”) offered by Sharp, are truly on the upper edge of what the European market demands... and what it will demand in the foreseeable future. Parallel to this, Sharp's dedication to the development and promotion of FULL-HD screens will also auger well for the future of the industry, driving all those involved in image production to aim for this quality level as being the new standard in years to come. It is evident that a number of technologies will cohabit the market side by side for many years to come, however the only single technology that efficiently covers all segments is LCD, and as the true pioneers in this technology, Sharp are placed in a very exciting position for the future.

Glossary

Aspect Ratio: The ratio of image width to image height. Wide screen TV's and HDTV are generally 16:9 aspect ratio, while the format we have generally been used to until now has been 4:3.

Coaxial cable: A cable in which one conductor is accurately centered inside another, with both conductors carrying signal - primarily for the transmission of high frequency, such as digital signals or television.

Composite Video: The composite video signal is one where the luminance and chrominance are mixed together.

Component Video: Video transmission that uses three separate video lines: one for luminance (black & white), and the remaining two for colour.

Contrast Ratio: The ratio between the darkest and lightest spot on a screen.

CRT: Cathode Ray Tube, used in direct-view TV monitors, computer desktop monitors and “tri-tube” projection devices.

DTV: Digital TV - a broadcast standard, which will ultimately replace analogue television broadcast signals we receive today.

DVI: Digital Visual Interface

FULL-HD: (see explanation of HDTV below) - Devices that have a resolution of at least 1080 lines.

HDTV: High Definition TV. This refers to new broadcasting and reception standards based on a much higher total number of pixels than on a standard PAL or Secam screen. The basic HDTV standards currently on the market are 720p, 1080i and 1080p. HDTV images are much clearer and sharper than standard PAL/SECAM images. See also pages on HDTV in this Special Report.

HD Ready: Refers to televisions, monitors and projection devices that have at least 720 lines resolution, and that can also display (through down conversion) images of 1080 lines.

LCD: Liquid Crystal Display - The active matrix LCD is also known as a thin film transistor (TFT) display.

OPC Function: A function specific to Sharp TVs which automatically adjusts the back-light's brightness level based on ambient light levels around the TV, giving users an optimal picture and preserving the brilliance of their TV for years to come.

PAL: Phase Alternation Line - a type of television signal, used in most parts of the World outside the USA.

Pixel: short for “picture element” - the basic unit of programmable color on a computer display or in a computer image. These are the tiny “dots” that make up a TV screen.

Plasma Display Panel (PDP): a display in which each pixel on the screen is illuminated by a tiny bit of plasma or charged gas, somewhat like a tiny neon light.

Progressive Scan: Video signal in which all the lines making up the image are displayed one after the other, from top to bottom in one single sweep.

Resolution: the number of pixels contained on a TV or monitor, expressed in terms of the number of pixels on the horizontal axis and the number on the vertical axis.

RGB: Video signal in which the chrominance is totally decoded in three primary colors - Red (R), Green (G) and Blue (B).

SECAM: Abbreviation of “Système Electronique Couleur Avec Memoire” - TV standard generally used in France.

TFT: Thin Film Transistor. This refers to “Active Matrix” LCD panels.

VGA: Video Graphics Array a display mode introduced by IBM in 1987 that allowed a choice between 16 colors at 640 x 480 pixels or 256 colors at 320 x 200 pixels.

Widescreen: A television with an aspect ratio of 16:9.

WXGA: Wide XGA (see XGA).

XGA: Extended Graphics Array - 1,024 by 768 resolution in 65,536 colors.

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*Not all features available on all models.