



## CES 2004

### Notes & Observations – Rev 4<sup>1</sup>

Gary Sasaki (gary.sasaki@digdia.com)<sup>2</sup>

The Consumer Electronics Show<sup>3</sup> continues to grow in size and stature, with about 129,000 attendees (17% growth) and 2,400 exhibitors (9% growth). While Comdex tries to evolve beyond the now deflated PC platform that it flew during the 80's and 90's, CES is accelerating on the "digital entertainment" platform of this decade.

Three main themes were visible this year – HDTV, AV Networking, and Mobility (of course, depending upon one's interests, there are many other things going on).

The following notes cover mostly the first two topics. (If you are reading this within Word, you can jump to the topics below by ctrl-clicking on them).

- [Main Observations](#)
- [More on the main themes](#)
  - [HDTV Gets Real](#)
    - [Session – Big Screen TVs](#)
    - [HDTV recording](#)
    - [Session - HDTV Content & Services](#)
  - [AV Networking](#)
    - [Protocols](#)
    - [Copy Protection](#)
    - [Physical Layer](#)
    - [Media hub](#)
    - [Software](#)
    - [Getting Content](#)
    - [Session – Michael Powell – FCC](#)
    - [Session – Telco-Entertainment Partnership](#)
    - [Session – Movie Distribution timeline](#)
    - [Session – "Getting it all Together"](#)
    - [Session – Media Hub Strategies](#)
    - [Session – Broadband](#)
    - [Session – Video Mgmt & Content Distribution](#)
  - [Taking it all with you](#)
    - [In the Home](#)
    - [Displays for Out and About](#)
    - [Photo-Video](#)
    - [Other Stuff](#)
- [Female Perspective to Shopping for CE](#)
- [VC Views](#)
- [Links](#)
- [Glossary](#)

<sup>1</sup> [Rev 3](#) – added a few more comments, and added list of links at the back. Rev 4 – added Glossary

<sup>2</sup> The former e-mail address ([gary\\_sasaki@comcast.net](mailto:gary_sasaki@comcast.net)) also works.

<sup>3</sup> See their website at <http://www.cesweb.org>

## Main Observations

- Digital Riptides – The U.S. consumer electronics market is expected to grow from an estimated \$96B in 2003 to \$101B in 2004 (5%). While only a modest growth on the surface the shift to digital is causing turmoil in individual market segments – something I've called "Digital Riptides". Early examples were the DVD and digital cameras. At CES 2004 we have digital TV, media hubs, wireless, digital video and other issues are driving change and growth while older markets shrink.
- The TV is dead; long live the DTV<sup>4</sup> – even the laggard companies are jumping in with products. Large and flat was everywhere. The CRT, even in rear projection form, was not to be found. Low-end Plasma is almost commoditized, despite the still high prices. And the plasma race is for size (winner at CES was Samsung's 1080x1920 80"). LCD is getting bigger, too (Samsung again, 57" prototype), and almost common below 30". DLP<sup>5</sup> is more visible and showing itself in flatter formats (Thompson/InFocus 61" and 6.9" deep). TV's with POD<sup>6</sup> and memory card slots were there. HD recording is now an assumed feature to soon expect (HDD<sup>7</sup> and optical disk). All in all, the buzz was not about when the DTV market will take off, but what needs to happen to help the eager but confused customer.
- AV Networking is just starting to go mainstream – last year the topic was just emerging with a few example niche prototypes and products. This year connectivity was showing up in more mainstream formats, like DVD/HDD players. The PC vs. TV battle is over, and the winner is the TV – but if you look closely, the PC is wearing sheep's clothing. Hard drives, Ethernet and memory cards were in everything. While the Cable MOU<sup>8</sup> gave new life to 1394a<sup>9</sup>, the implications were not yet visible at CES. Instead, there was a new push for DTCP-IP<sup>10</sup>, a copy protection scheme created for 1394a that they now want to get approval for Ethernet. If successful, SmartRight<sup>11</sup> falls and the possibilities bust open. And getting rid of cables continues, with power line extending to 170 Mb/s, 802.11x<sup>12</sup>, UWB<sup>13</sup> and even some IR on

---

<sup>4</sup> DTV – Digital Television

<sup>5</sup> DLP – Texas Instrument's Digital Light Processing image engine, based on micro-mirrors (<http://www.dlp.com>)

<sup>6</sup> POD – Point of Deployment module or card allowing access to one of the digital cable services, such as Motorola's or Scientific Atlanta's. See Cable MOU footnote.

<sup>7</sup> HDD – Hard Disk Drive

<sup>8</sup> Cable MOU – Cable Memorandum of Understanding – often called Cable Plug and Play for one-way services. (<http://www.ncta.com/images/Q&Afinal.pdf>) Next step is two-way services.

<sup>9</sup> IEEE 1394a, aka Firewire (Apple, where it was created) and iLink (Sony)

<sup>10</sup> DTCP-IP - Digital Transmission Content Protection for Internet Protocol ([http://www.intel.com/idf/us/fall2003/presentations/F03USDGHS86\\_OS.pdf](http://www.intel.com/idf/us/fall2003/presentations/F03USDGHS86_OS.pdf))

<sup>11</sup> SmartRight – Thompson originated authorized domain scheme based on smartcards

<sup>12</sup> 802.11x – x refers to "b", "a", "g" and a little of "n" and other variants.

<sup>13</sup> UWB – Ultra-Wideband, a set of very wide spread spectrum techniques affording relatively high bandwidth, but over relatively modest distances. Can be useful for things like HD video links.

display. The backroom issues, normally an NAB/IBC<sup>14</sup> topic was also visible, with examples like Microsoft's "IPTV" being an interesting one to see. So, bottom line, AV Networking is still years away from mainstream, but early adopters can now start to buy some practical products in 2004.

- You can take it all with you – mobility means more than just phones here. Within the home there were several wireless displays, reminiscent of HP's ViewPad shown several years ago. Within the car XM radio seemed to finally get some respect. Phones and PDAs? Color displays, still and video imaging, fancy shapes and sounds, etc., seemed common – but I did not really cover phones and PDAs at all, so probably missed something really significant. Meantime, with PMA<sup>15</sup> just around the corner, cameras were a little quite. There were some new camcorders, however. Sony revamped most of its lines, but the buzz was around several memory card based photo-video cameras – Panasonic's for example, with real video and decent photos in a very small format based on SD cards. Sony also had a very nice photo-video camera. So, we are getting to within a few years when what we carry is limited more by the user interface than technical issues such as memory capacity, processing speed and battery life.
- Confused Consumer – We are entering an age when consumer confusion will be a major issue, not that it isn't an issue already. Throughout the show people in industry and people asking questions to the vendors showed evidence of this. Benefits for some things like AV Networking are not clear, choice of technology in "simple" things like displays is overwhelming, and setup and operation of products is getting more complex. The CE industry has not faced such a Tower of Babel before, and it will take the next five years to sort it all out for the consumer. Through all this the excitement will be high at CES because new things will continue to show up, like the early days of Comdex.
- CE horserace – Samsung seemed to make the biggest impression this year, starting with the 80" Plasma flag, but is weak in cameras. LG looked like it was chasing Samsung, but came across as more impressive than in years past. Panasonic had a good showing and they look to be emerging from behind Sony's shadow to take up their own voice. Sony looked good in cameras/camcorders, but less exciting elsewhere. Sharp is smart to focus on LCD. Philips, Thompson, and Toshiba had some nice things, but did not seem to stand out. Microsoft didn't have as much new this year. HP had a good keynote, but did not follow up in their booth. Intel has a difficult job in getting their message across.

---

<sup>14</sup> NAB – National Association of Broadcasters (U.S.); IBC – International Broadcasting Convention (Europe)

<sup>15</sup> PMA – Photo Marketing Association conference

## More on the Main Themes

This section takes a closer look at the three main themes of HDTV, AV Networking and Mobility.

### HDTV Gets Real

Gary Shapiro (CEA President) and Michael Powell (FCC Chairman) both observed that 2003 saw the "tipping point" for HDTV. A number of factors helped to tip the balance.

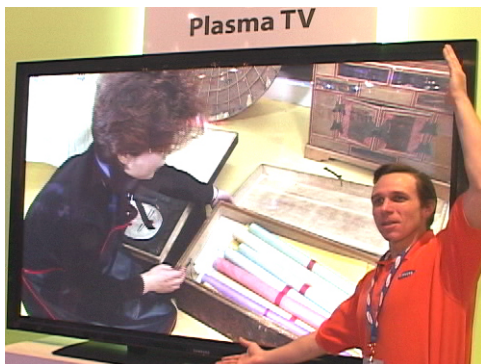
First, there was the Cable MOU<sup>16</sup> announced last year that clarified how DTVs would connect to one-way digital cable services. Second, the MSOs began to take HDTV content a little more seriously as DBS<sup>17</sup> competition heated up. Third, we are just a little closer to the goal of switching to all digital TV<sup>18</sup>, and the consumer has had another year to see the big screens at the store and letter-box movies from their DVDs. Fourth, prices are getting a tad more attractive, helped by a couple of products like Gateway's \$3000 entry, and many others.

LCD and Plasma dominated the booths. LCD showed up in more innovative formats, while Plasma dominated the size game. There was several rear projection TVs, too. There was not much in the way of front projectors.

**LG** advertised their 76" Plasma on the side of a hotel across from CES, beating their previous 71" record. This was one of the full 1080x1920 Plasmas at the show. It comes out in the fall, and price is unknown.



LG 76" Plasma



Samsung 80" Plasma (Samsung photo)

Not to be outdone, **Samsung** trotted out an even bigger 80" 1080x1920 Plasma. Price and availability are unknown.

Plasma's weaknesses are slowly being addressed. Panel life is said to be improving and the largest panels now have full 1080x1920 true HDTV resolution. Heat, weight and power still seem to be issues. Prices are still a premium, but Plasmas seem to still capture the consumer's fancy.

In fact, the Plasma TV has suddenly become every company's new product. While **Gateway** was not visible at CES, just about everyone else was. The next page shows some fast photos taken of most of the Plasma TVs and monitors shown at CES this year...

<sup>16</sup> Memorandum of Understanding reached by the cable operators (Multiple System Operators, or MSOs) and CE manufacturers, with a little encouragement from the FCC.

<sup>17</sup> Digital Broadcast Satellite, aka Direct to Home (DTH)

<sup>18</sup> While 2006 is often stated as something mandated by law as the year analog TV turns off, in reality the year is only a goal. No one thinks that 85% of the market will be able to get DTV programming by then, though as Michael Powell stated, "Once you pass the tipping point, things can happen unpredictably fast."

# Plasma Displays & TVs at CES 2004



© gary sasaki 2004



A few stand out as noteworthy or provocative.

**Philips** had their cute **Mira** display tucked in one corner of their booth. Mira is an LCD display behind a mirrored glass so that when the TV is off the person just sees a mirror. The picture to the immediate right shows the reflection of a woman looking at one of these displays while turned off. On the far right is a larger mirror where the LCD display is turned on at the bottom. The picture frames come with the display, though one can use their own frames. The displays are deeper than I expected – 3 1/2" – and you still have to figure out the power cord. The 23" 23MW9110 was priced at \$3800 and the 17" version was priced at \$2500. From casual observation, these products seemed to attract women buyers, perhaps because the display is hidden when turned off.

Philips Mira LCD TV



A very clever product came from a **Thompson** and **InFocus** collaboration, shown as an RCA Scenium branded 61" DLP TV that was only 6.9" deep. InFocus provided the optics, which they were not willing to talk about when asked. Thompson did all the rest. The 61" model is supposed to be available sometime in 2004 for \$10K, and a 50" version will be \$9K. Later in 2005 a 70" version is planned.

They used **T.I.**'s newest HD3 DLP chip (720x1280). For some reason, T.I. kept a little quiet about the why the HD3 was supposed to be better than the HD2 chip. T.I. also did not make much noise about the xHD3 chip, which is supposed to deliver 1080 resolution.



Thompson-InFocus  
61" DLP, 6.9" deep



If you look at the page of plasma TVs, one brand you won't find is **Sharp**. They made the smart move to focus on LCD displays. The model to the left (LC-45G1U) is a respectable 45", full 1080x1920 TV with memory slot, built in digital audio amplifiers and digital cable plug and

play. The memory slot accepts JPEG photos and MPEG4 video clips. Two speaker configurations exist – on the bottom as shown here, and on the sides. The LC-45GD4U (side speakers) will be available in July for \$11K.



Sharp 45" LCD TV

Sharp used CES to highlight their new Kameyama plant, capable of making

1,500x1,800mm panels (fits 8 32"W panels). 26", 32" and 37" monitors will be made here.

Again, not to be outdone in the size game, **Samsung** showed a prototype 57" LCD TV, along with "smaller" models. Samsung is reported to be skipping the "6<sup>th</sup> generation" LCD plant, and going directly to a 7<sup>th</sup> generation plant aimed at 32/40" panels. This is also where **Sony** is going to pitch in some investment.



Samsung LCD line of TVs

Samsung just edged out **LG**'s 55" prototype. Prices for the Samsung and LG models were not given.

Another trick **Samsung** showed was a prototype wireless (802.11a) TV (see module in the back of the TV). This was shown on a 50" Plasma set, and is said to add about \$2K to the price.



Samsung wireless TV

Between the Plasma and LCD models I saw, I would personally pick LCD, but I'd have to wait for prices to come down and a few interface issues to settle out.



Panasonic Viera 50" Plasma  
(Panasonic photo)

Speaking of interface issues, **Panasonic** was making a big deal that they were the first to come out with a TV with built-in **OCAP**<sup>19</sup>. This is not necessarily the same as the two-way Cable MOU that the FCC is asking the industry to work on. Panasonic partnered with **Comcast**, **Time-Warner**, **Motorola** and **Concurrent**<sup>20</sup>. During Panasonic's key note talk, Mark Coblitz, VP of Strategic Planning for Comcast, introduced the OCAP TV and talked about the new services they had planned – e.g. Starz on demand and SVOD. OCAP was gaining momentum the last time I looked, and it will be interesting to see how the

two-way MOU shakes out.

This product will be out in about 6 months.

Panasonic has given a new name to their panel TV lines (plasma and LCD) – Viera.



<sup>19</sup> OCAP – CableLab's Open Cable Applications Platform for two-way cable services. The Panasonic unit has not yet been certified (not sure if a certification system is in place yet).

<sup>20</sup> They partnered with Comcast and Time-Warner for cable, Motorola for digital cable access, and Concurrent for Video on Demand and maybe Electronic Program Guide (EPG).

In the TV front, Sony did not seem to have as much to show to stand up beyond all the noise from their competitors. It is well known in the industry that Sony has decided to invest with Samsung for LCD and NEC for plasma. Their TVs did seem to sport more stylish design, particularly with their "floating design" plasma TVs (photo is from Sony – the one I took did not come out very well).

Of course, the Memory Stick is supported in some TVs, and they can now read JPEG and MPEG1.



Sony Projector using LCOS

One area with some

apparent innovation was found in Sony's Qualia SXR projector, using their version of an LCOS<sup>21</sup> imaging engine. The Qualia line is

Sony's showcase line, so this projector was not aimed at the usual consumer (price is \$24K).

Sony also showed their **LocationFree TV**. Using 802.11b/g/a for wireless, the touch screen display can be used for watching TV, surfing the web or showing photos via the Memory Stick slot. The base station (vertical box in background in photo) holds the TV tuner. This product is already out in Japan and has not yet been priced for the U.S.



Sony LocationFree TV

**HP** announced that they were planning on introducing an HP branded<sup>22</sup> 42" plasma TV<sup>23</sup> in June. A 30" LCD is also planned. No prototypes were shown in the HP booth, and only a mock display could be found in the Microsoft booth. In Carly's keynote, the differentiation will come from being able to "view any content from any source of any kind." No doubt part of their logic is to complement their Media Center PC (HP signed with **Microsoft** to embed Media Center extensions into their TVs), so maybe some really sweet bundles are planned.

Meantime, **Dell** is also jumping into Plasma TVs; but they've taken a different approach. At CES they showed TVs from Planar<sup>24</sup> and have not put the Dell brand

<sup>21</sup> LCOS – Liquid Crystal on Silicon, a reflective image engine that is just emerging

<sup>22</sup> Claimed to also be based on an HP imaging engine.

<sup>23</sup> See press release: <http://www.hp.com/hpinfo/newsroom/press/2004/040108a.html>

<sup>24</sup> <http://www.planar.com/> - Planar is a US company that has been involved in various panel displays. The Planar folks are positioning their 42" product as "true HDTV", when in fact it is a 768x1024 resolution monitor – poor judgement.



on it. Smart move – Dell sees that 1) Plasmas have not yet reached the commodity phase, but they can still take advantage of their low cost channel, 2) Dell's brand is not as easily stretched to cover plasmas, and 3) people want to see the TV before they buy it, so now they can go to the store to see it, but order it through Dell. In the case of Planar, they've also positioned it for commercial use, not consumer use. For consumer markets Dell has a number of other well known brands on their website.

Dell has chosen to use their brand for LCD products. Here the bridge from their PC heritage is more obvious (HP also has some LCD TV products they've announced).

**Epson's** provocative move was a 57" LCD RPTV<sup>25</sup> with integrated printer and CDR drive. It is a strange combination that got more interest for its uniqueness than its appeal.



Epson TV close up

Ironically, Epson used a dye-sub printer instead of inkjet because they felt it would be easier and cleaner to change out the cartridges. The CDR portion looked bolted on, while the printer was better integrated. A 57" model sells for \$4K and a 47" version for \$3.5K. They are working on a 64" full 1080 resolution LCD model.



Epson LCD RPTV with printer & CDR

Surprisingly, **Polaroid** showed up a second time with their TV, DVD player, etc. These come via the Petters Group and are pass-through products; but, still it seems to make no sense.

Off to the side **Samsung** also showed off their "**Digital Natural Image Engine**". This is a series of algorithms for adjusting the image on a TV to make things look better. The list included resolution interpolation, motion optimizer, contrast enhancer, detail enhancer and color optimizer. The most interesting item was color blind optimizing – for people that are partially color blind they can set up the color to make the images better looking.

<sup>25</sup> RPTV – Rear Projection TV

**Time to Buy?** It is time to buy an HDTV? Almost – sets are now showing up with appropriate connectivity, such as HDMI<sup>26</sup>, CableCARD<sup>27</sup> slots with compliance to the Cable MOU<sup>28</sup> "one-way Plug and Play" agreement. But, a few things are waiting in the wings. One is the yet-to-be-started two-way Cable MOU. This will make it easier to deal with interactive cable services.

Another missing ingredient is the rest of the system. While the Cable MOU requires a 1394a link with DTCP<sup>29</sup>, there are not too many complementary HDTV recorder/player products that comply. Therefore, if you plug the digital cable directly to the TV, you won't be able to record anything.

There are other interface issues in the queue, such as the Broadcast Flag<sup>30</sup> and DTCP-IP<sup>31</sup> or SmartRight.

If you are buying a panel to mount on the wall, be mindful of the cables you need to route. Power will always be one cable to worry about, but the video cable will soon have wireless options in a couple of years.

Then there is the choice of technologies.

LCD panels offer the lightest weight, lowest power; but they are still pricy, particularly in the larger sizes, and side viewing is "OK" at the extremes. Prices will come down fast, so waiting can save money.

Plasma (from at least some vendors) seems to have addressed tube life issues, but is still heavy and takes power. For the largest panel sizes, plasma is the choice.

Rear projection is a more economical path, with DLP offering relatively nice tradeoffs; but, resolution is still limited to 720p and some might still notice a bit of the rainbow effect<sup>32</sup>. LCD RPTV is OK. The non-CRT RPTVs can be fairly trim, avoiding the big boxy look. CRTs are still cheaper, however.

Front projection is for the temporary situation, or for people that can afford to dedicate a specific area for it. You do get the biggest picture/buck this way.

On the other hand, if you have the money, go for it. You can always buy another.

---

<sup>26</sup> HDMI – High Definition Multimedia Interface, a DVI-based link which incorporates the required HDCP (High-bandwidth Digital Copy Protection). Silicon Image is the only IC vendor supporting this so far, and sets from Sony, Panasonic and Pioneer were introduced with it.

<sup>27</sup> CableCARD – known in the industry as a POD (Point of Deployment) card – allows access to conditional access content on digital cable systems, and is necessary if one wishes to avoid the set top box.

<sup>28</sup> Cable MOU (memorandum of understanding) – set the rules for how a TV can connect directly to digital cable without needing a set top box.

<sup>29</sup> DTCP – Digital Transmission Copy Protection, required for any 1394a link carrying protected content, such as a movie.

<sup>30</sup> Broadcast Flag – a flag that signals content that cannot be recorded or has recording restrictions.

<sup>31</sup> DTCP-IP – Same as DTCP, but employed over Ethernet. Whereas DTCP has the blessing of the studios, DTCP-IP does not yet have their blessing.

<sup>32</sup> Rainbow effect happens because one DLP chip is used for three colors, rotated in sequentially. If you blink you might notice red, blue and green stripes or artifacts in the picture. Newer sets exhibit less of this effect. Three chip sets (used in many LCD and more expensive DLP units) don't have this problem.

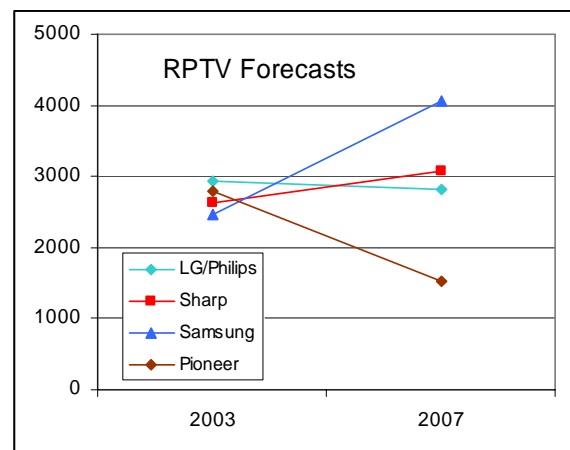
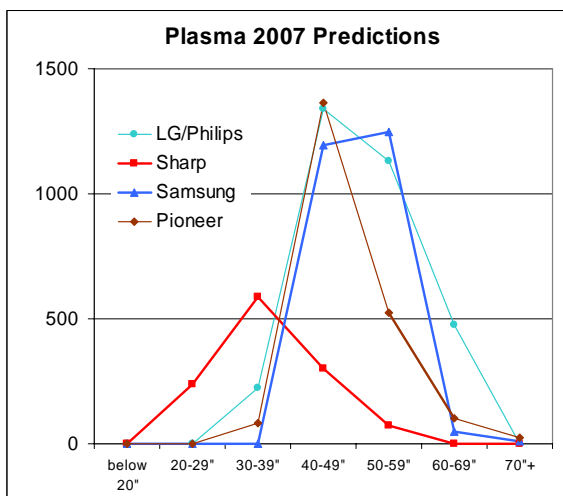
## Big Screen TV (Session E4)

The moderator (Chris Chinnock, Insight Media) asked the four panelists for their predictions before the conference, and then shows and compared the numbers he got. **Philips** (Bruce Berkoff) shows numbers from iSupply/Stanford Resources. The others from **Sharp** (Robert Scaglione), **Samsung** (Jim Sanduski) and **Pioneer** (Matt Dever) supplied their own guesses. Samsung was probably the most balanced since they've got an iron in just about every fire.



The forecast for Rear Projection TV (RPTV) was interesting because of the wide divergence (chart shows 000's units, U.S. markets only). Pioneer, a relative new player, is pushing their plasma line and so they are bullish

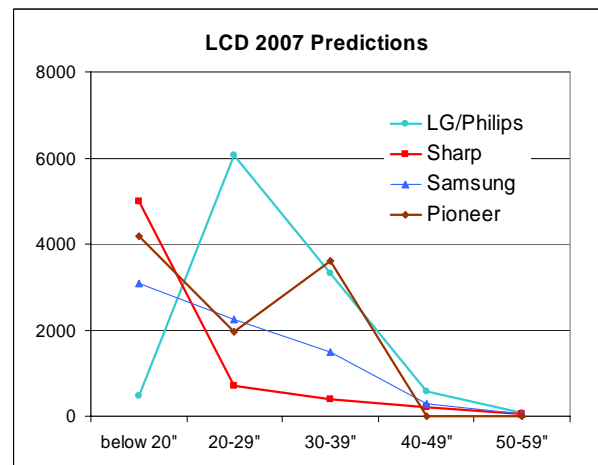
on flat, not RPTV. Samsung felt that the low cost afforded by RPTV will keep the volume up, and that prices will get even lower. Philips agreed, and said the iSupply numbers looked too low. And, not everyone wants to hang a TV on the wall.



For **Plasma**, the following chart shows Sharp's bias towards LCD. Philips actually tends to agree with Sharp on this, and if Bruce were to create the Plasma forecast himself, it would not show as many units.

Finally, **LCD** forecasts again show Sharp's bias.

Sharp said they were going to get very aggressive on LCD pricing. A 45" LCD might cost \$10K today, but Sharp thinks that they will be within "striking distance" of Plasma prices within 2 years. Philips, however, does not think that a 42" LCD will go down much in the next year or so. Philips thinks that 26" LCD prices will go down this year,



32" LCD prices will go down in 2005, and finally 42" LCD prices will later go down.

Samsung was less aggressive on the smaller LCD units because they felt the new generation 6 & 7 fabs were optimized to make the larger screen sizes to maximize margins. At the same time, Samsung defended Plasma because they felt the prices for 42" panels were going to come down dramatically. Samsung added that panel life is increasing, from what used to be 20K hours to a current 50-60K hours. Samsung did not think that panel life was a problem today.

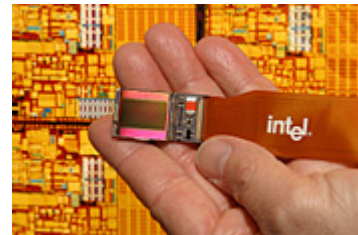
Pioneer talked about how their original Plasma line was 2 miles long, and that they soon got it down to 1/4 mile long, and now it is getting even shorter. This was their evidence that Plasma prices are going down.

Other factoids – a year ago most Plasma panels went to commercial markets and now consumer volume has exceeded commercial volume. The commercial use of Plasma also has some problems, such as a tendency to show static images, thus burning the phosphor.

Everyone felt that women like the flat screens over the bulkier RPTVs. Everyone also agreed that TVs are something people want to see before they buy – a snipe made at Gateway and Dell.

But, the in-store experience is not perfect either. All of them complained that stores vary in ambient light, source material, calibration (or lack thereof), etc. One of the challenges is education of the channel and the customer. One trick that Sharp uses is they survey different stores in the area and if they find one that does a particularly good job, they tell the other stores about it.

Regarding LCOS, everyone noted Intel's announcement just prior to CES<sup>33</sup>. (Interestingly, Intel was not showing off any LCOS technology in their booth, but had it in the back room.)



Samsung's comment was that LCOS may or may not be successful. Because of the delays in getting to a practical engine, DLP is being given a chance to beat down costs.

Samsung made another interesting comment about RPTVs, saying that it is simply not economically practical to sell an RPTV for less than about \$1K due to the costs involved. In contrast, a front projector uses "nothing but air", so the economics are different. Front projectors were not discussed much, but one comment was that the difficult-to-demo FPTV will get easier to sell as higher quality content becomes more available.

---

<sup>33</sup> Intel's LCOS chips are supposed to be 720 and 1080 line resolution.



**HDTV Recording** - Blu-Ray and AOD continue to fight it out, but Blu-Ray is getting more support. **HP** and **Dell** announced their support for Blu-Ray, and a contact of mine in Sony was very happy about this. Hard to say what Dell may have in mind. In both cases an early objection was Blu-Ray's restrictions when placed inside a



Samsung Blu-Ray drive  
(Samsung photo)

PC. Perhaps these restrictions have changed.

Regarding red laser DVD, both the DVD+R and DVD-R camps already announced 8.5GB dual layer recording at CEATEC<sup>34</sup> late last year. There were a few demos of both (though Philips didn't seem to show anything for some reason). The demo to the right alternated between layer 0 and 1 to

demonstrate that there was no difference between the two. In addition to recording on optical media, there were a few prototype products that allowed HD recording onto HDD. One of these will be mentioned later on in the AV Networking section.

**HD Camcorder** - On the HD camcorder front, Panasonic showed off their SD-based broadcast-quality HD camcorder using something they called "P2 technology" (refers to the memory cards, I think)<sup>35</sup>. The camcorder looked like a tape-based unit. They said it will be used for the Athens Olympics.

Further, they said that by 2006 a consumer grade HD camcorder using 4GB SD cards will be introduced.



Pioneer 8.5GB DVD-R

<sup>34</sup> CEATEC 2003 was in Japan in October

<sup>35</sup> Panasonic appears to be working with Pinnacle so that content captured on "P2 Cards" can be edited.

### HDTV Content & Services – (Session DH8)

One of the Digital Hollywood sessions was on Digital Cable and Satellite strategies. Here are some of the comments made in this session. Panelists were Stephanie Campbell (VP Programming, DirecTV), Steve Heeb (VP Bus Dev, Comcast), Rob Jacobson (COO, InDemand), Karl Meisenbach (Director Advertising, HDNet), Tettermer (Red Tettermer, market research), Deron Triff (VP, Digital Ventures PBS), and Ken Rutkowski (Ken Radio).



- Tettermer did a "deprivation study" where consumers were not allowed to watch TV and found that symptoms were very similar to that of drug addicts.
- PBS is going to package content for a special HD channel.
- HD Eye Candy - InDemand said that movies don't translate well to HD – I didn't catch why. But Rob went on to say that people with HD sets like eye candy – anything that is HD content that shows off how good it looks. He said that they broadcasted a Yule Log during the holidays and found that it rated in the top ten programs watched!
- On Bandwidth - Comcast admitted that they have a problem balancing how to use their bandwidth to accommodate HD, etc., and that this problem will only go away when they switch to all digital<sup>36</sup>.
- Confusion - Tettermer said that people buy an HDTV set and expect that they will automatically get HD content. When they don't get it, they sometimes return the set. There is lots of consumer confusion, and the help in the store doesn't always help.

---

<sup>36</sup> While cable has much more raw bandwidth than satellite, cable still must broadcast the analog channels, and each analog channel takes the bandwidth of several digital channels.

- On PVRs – DirecTV finds that customer with PVRs have higher retention rates. Comcast said that the PVR is a "must do" in their strategy. Tetteimer said that consumers often turn to content stored on the PVR first, and then they turn to InDemand second. Tetteimer said that in focus groups, consumers with PVRs didn't do the usual 15 minutes of complaining about their cable or satellite service. Comcast asserted that a PVR is a lifestyle choice, while HDTV is a Luxury choice.
- On iTV - DirecTV is heading towards adding iTV (interactive TV), but it is too early to say much since it just after Murdock's acquisition<sup>37</sup>.
- On Advertising – Very few advertisers produce content in HD. They "don't get it". During the Super Bowl only a few movie trailers did ads in HD. Doing ads in HD requires a little more expense in postproduction. Movie trailers already had the HD content for other reasons, but ordinary ads don't.

---

<sup>37</sup> Murdock has some iTV in his other satellite services.

## Main Themes - AV Networking

"AV Networking" is a loose term that I use to describe the ecosystem of delivering and enjoying of content through the network. The complete value chain starts in the production and distribution of the content. The content is then enjoyed in the home, or elsewhere, via traditional or new types of devices. Content can be distributed in non-traditional ways. MP3 is an early example.

The protocols - A number of industry efforts have been going on aimed at making it practical to connect different AV devices to each other, to PCs and to Services via some form of TCP/IP networked link. The CEA, sponsor of CES, has a number of subcommittees (R7.4, R7.5 and R7.6, ask **DENi**<sup>38</sup>). Earlier there was **HAVi**<sup>39</sup>, which was based on 1394a. Matsushita was an early visible backer of HAVi, but they were not there at CES this year. The latest to emerge and the one that seems to have gathered the most momentum is **DHWG**<sup>40</sup>. Intel and Microsoft probably made the most noise about DHWG at CES, but conversations with some of the CE companies indicate good support from them, too.

**HighMAT**<sup>41</sup> continues to show up, though mostly in a few Panasonic and Apex products. HighMAT and Music-Photo-Video (MPV) formats offer ways to organize content in a device. I did not see any evidence of MPV at the show.

Copy Protection – In the past a technique from Thompson called SmartRight looked promising (and it may still be) for assuring protection of content sent over Ethernet. The MPAA has favored this approach, albeit with some reservations. SmartRight is smartcard based and it forms an authorized domain within which protected content can travel freely. I did not see the SmartRight booth at CES, though reportedly they were there.

But, several companies<sup>42</sup> recently announced DTCP-IP for emulating the DTCP over a TCP/IP link. Panasonic talked about it first at CES during their keynote.

DTCP was previously only used over 1394 (and approved of by MPAA). In this case, I'm told that the MPAA has not yet bought into DTCP-IP. From earlier discussion I've had with them, they will need considerable convincing. DTCP does appear to address some of MPAA's concerns. For example, the Time-to-Live (TTL) is set to 3 to help prevent content from going too far in a network. This might address the "vacation home" scenario<sup>43</sup> that bothers the MPAA. The number of

---

<sup>38</sup> DENi – Digital Entertainment Network initiative, lead by Pioneer and now the focus of CEA R7.6.

<sup>39</sup> HAVi – Home Audio Video interoperability, implemented by Matsushita so far, but not by much else.

<sup>40</sup> DHWG – Digital Home Working Group, participated by major CE and PC companies.

<http://www.dhwg.org>

<sup>41</sup> HighMAT comes from Microsoft, whereas MPV was originated in HP

<sup>42</sup> DTCP-IP was announced by Intel at their Developer's Forum late last year. The "5C" companies behind DTCP are Intel, Matsushita (Panasonic), Sony, Toshiba and Hitachi. Warner Brothers and Sony Pictures participated in 5C, and they may also be participating in DTCP-IP.

<sup>43</sup> The MPAA feels that content should not be allowed to travel between a person's home and their "vacation home" (a proxy for a home outside of the immediate area). Partly this is about Napster-like fears, and partly it is about control of content across distribution right regions.



connected clients is limited to 34, also to help prevent wide peer-to-peer distribution. Of course, content is encrypted, but they also specify WEP<sup>44</sup> for wireless links and hint at additional requirements.

On the non-technical front, HP seemed to make waves with Carly's star filled speech announcing that copy protection/DRM will be put in every one of HP's consumer products. Smart move if done well.

The physical layer – almost everyone used 100baseT or 802.11a or g. For example, Philips used 11g on an LCD TV – but anyone with a 2.4GHz cordless phone knows the problem with 11g. The news this year was Panasonic's announcement of a 170Mb/s power line



Panasonic's Dr. Paul Liao with 170Mb/s powerline network demo

network, which they demonstrated in their keynote.

They called it HomePlug AV (it was also called HD-PLC for HD Power line communications). The demo showed a HD stream going from one system to another on stage.



Panasonic power line LAN modules

Separately, Intellon announced their 200Mb/s "PowerAV" power line network, with

an effective data throughput of about 100Mb/s (not clear if Panasonic's data rate is raw or effective).

A cute product came from Asoka – PlugLAN network jack. This was a wall outlet with power line networking circuitry built into the outlet, so you don't need an external plug-in module.



Toshiba UWB wireless – sending HDTV from one area to the other

Toshiba showed off a prototype of their Ultra-Wideband (UWB) wireless link. UWB is good for relatively high bandwidths, but has only modest range. Many companies (like Sony) felt that UWB can be useful to eliminate cables to flat panels mounted on the wall. Toshiba did not have price/availability info, but said that maybe it will be out in about 2 years.



Asoka PlugLAN

<sup>44</sup> WEP – wired equivalent privacy, thought to be a relatively weak encryption technique for wireless 802.11.

**The "media hub"** - While in past CES exhibits the concept of AV Networking showed up in non-working concept (e.g. Samsung media server) or niche (e.g. Sony's Room Link<sup>45</sup>) products. This year products were much more solid and were based on mainstream functions like DVD-recorder/PVR combos.

**Pioneer** did show a prototype of an AV server that was based on DENi. It went by the name Digital Library; a title initially used a couple of years ago and advanced in capability each year. The Pioneer product might see product form by the end of the year, but no decision has been made. If so, perhaps it might go for about \$1K. The prototype was developed in a lab that Pioneer has in San Jose. It can record HD content, music, photos, etc. and send it around the home over 100baseT. Last year they used Mediabolic software, but dropped it in favor of their own (Linux-based, I think). It does not use OCAP, but is said to use "something similar". Interestingly, they did not play up this prototype in the press the way they did previous versions.



Pioneer Digital Library screen shot

**Panasonic** showed a "working" AVC Server during their keynote and displayed it behind glass on the floor. The product is not supposed to be out until 2005. It currently has a 250 GB HDD, connects via Ethernet (and 1394a?), can handle HD content, record on DVD RAM and SD cards, and supports an EPG<sup>46</sup>.



Panasonic prototype AVC Server



Pacco Group "ix Media Center" using Microsoft

**Microsoft** continued to push their Media Center software. Several PC variants were there, but Microsoft is now trying to get into the living room via more conventional doors. The box to the left is a Media Center PC in disguise. It looks like a DVD recorder, but has a HDD and can do the other

things that the Media Center can do, including dropping back to the XP operating system screen. Microsoft was showing this off in their "home"<sup>47</sup> out in the parking lot



Does Gates stay here during CES?

<sup>45</sup> Room Link, and similar products shown last year, used 802.11x to link content stored on the PC to the TV. Thus, photos, music and sometimes video (not all products did video) could be enjoyed in the TV room.

<sup>46</sup> EPG – Electronic Program Guide

(Microsoft's booth inside the hall was like a Comdex-style booth).

Microsoft also introduced their X-Box Media Center Extender kit. The X-Box is set up to link with the Media Center PC via wired or wireless Ethernet. The consumer gets an additional remote control and some software. Now, content stored on the PC can be enjoyed on the TV via the X-Box. Available later this year.

Microsoft will always get companies to follow their lead, but the question is going to be if the consumer will. The Media Center PCs are popular because they add to the PC package for certain demographics. The X-Box extender serves some of the same demographics. Beyond this, however, Microsoft has a bigger challenge. One impressive Microsoft play will be talked about later.

**Philips** showed an extension to a product they introduced last year – the Streamium MX6000i streams music, photos, short videos from the PC to the TV via 802.11b/g. It can also play, but not record DVDs via its 5 disk player. There is no local buffering, so it is a fairly thin client. They've an arrangement with Yahoo and iFilm for video content that you can call up. Software in the product sniffs out the content in the PC for you. The TV does not have to be on to listen to the Internet radio or music. It comes with a surround sound speaker set. It's available in February for \$800.



Philips Streamium 6000



DLink Wireless Media Player  
media hub moving forward.

Even **D-Link** is jumping in with their DSM-310 which can play DVDs, read several types of memory cards, and link via 802.11g. The unit shown was a fairly crude prototype and price/availability is unknown.

But, all of the equivalent PC to TV streaming products of last year from Sony, HP and others were not to be found. These products had fairly narrow market potential and vendors have figured out that the DVD/PVR will be a more common

During Carly's keynote, she announced that HP will be coming out with an "Entertainment Hub" this fall. It looks to include DVD (not sure about DVD+R or dual layer +R, but would hope so) and PVR functionality, will handle HDTV content and be networked. Most likely it will be based on Microsoft components.

Other DVD-recorder/HDD PVRs not shown include:

- **Sony's** RDR-GX line with DVD±RW/120GB HDD (\$500 for unit w/o HDD in July, info on unit with HDD not yet released);

<sup>47</sup> <http://www.nextgen04.com/> NextGen Home – sponsored by several companies, but somehow dominated by Microsoft

- **Toshiba's** RD-SX32 DVD-R/80GB HDD (160GB version also exists);
- **Sharp's** DV-HR300U DVD-R/80GB HDD (\$800);
- **Zenith's** (LG) DVD recorder/80GB HDD (model # unknown, \$600 in August);
- **LG** model with 120GB HDD (\$800 in August);
- **Panasonic** DMR-E100HS DVD-R/120 GB HDD (\$900),
- **Pioneer** DVR-57H DVD-R/120 GB HDD TiVo (\$1800). Note how DVD-R seems to be more common than DVD+R.

**Software** – the day before CES, **Samsung** and **Philips** announced their Universal Home Application Programming Interface (UH-API) for consumer devices using their components. It is another step towards breaking down the proprietary software of the past. It is unclear if this will work with the other open movement, CE Linux, that was announced last year.

Off-site, Samsung was also demonstrating their eXpandable Home Theater (XHT) interface system. This is based on HTTP protocols and allows several devices to throw their interface onto a common screen.

Meantime, Samsung also showed an RS232-based proprietary "AnyNet" arrangement that let one remote control (RCU) control a number of boxes. So asking to play a DVD will cause the DVD to power on, select a DVD, set the AV Receiver to Cinema mode, and adjust the aspect ratio of the TV.

**Getting Content** – Downloaded music and radio are the earliest examples of content coming in via the Internet. Movie clips and short subjects are another. Graduating beyond these relatively simple content types are TV and Movies.

Last year, **Disney** announced a bold move with their MovieBeam service. This service uses the digital signal broadcasted from selected local TV stations to load up a consumer's 160GB HDD with 100 movies. When ordered, the MovieBeam unit (made by **Samsung**) is FedEx'd to you preloaded with movies. After that, about 10 new movies are swapped in each week (they say a movie sticks around in the unit for about 8 weeks. All the major studios, except Paramount, are participating (it is not just Disney content) with content coming from movies in the VOD window<sup>48</sup>.

When the consumer "orders" a movie, they get 24 hours within which to watch it and they are charged between \$2.49 and \$3.99. The box itself is rented for \$6.99/month. The phone is used to call back to the service for billing – so a cable or Radio Shack wireless phone link is needed.

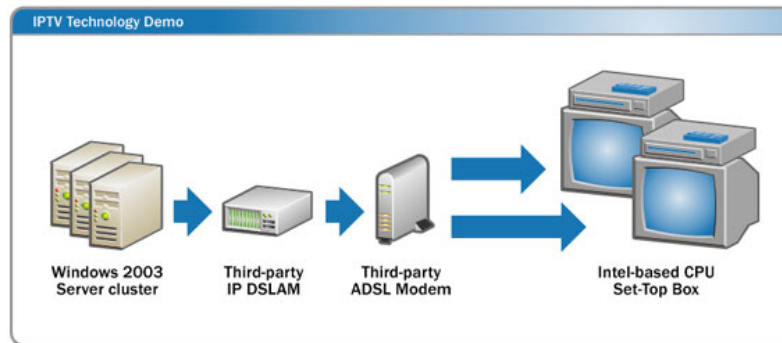


Samsung MovieBeam player

<sup>48</sup> VOD window is similar to the pay-per-view window.



MovieBeam is available in only three markets so far. It is an alternative for people that don't have access to VOD.



Microsoft's IPTV may be one of the more significant products they showed at CES. IPTV sends TV content over ADSL. Sending TV over a DSL line is not new – Pace makes a STB for this (used mostly in Europe), for example. What is significant is that Microsoft has decided that it is now ready for them to jump in after considering this move for many years. They were in R&D mode just a few months ago and recently switched to product demo mode.

So far, Microsoft has gotten one service provider to sign up (Swisscom). Microsoft is targeting Europe & Asia because their DSL can have much more bandwidth to the home than in the U.S.

The diagram that Microsoft publishes (above) is a simplified. The way it works is that live streams from different TV sources are encoded real-time in a set of encoders. These encoders are perhaps the most expensive system component, at about \$50K/per channel. The encoded streams are then multicasted over a high speed network to a series of PCs. Each PC can handle 750 to 1,000 homes. It costs about \$5K/client.

A consumer switches on their STB and calls up the channel they want via an EPG. The goal is to get the cost of the STB down to \$50. Microsoft is giving away the license for the client side, and is going to make their money from the server side. Microsoft would like to see their client built into all kinds of things, noting that some TVs already have an Ethernet port. Of course, the system uses Windows Media 9.

It takes about a 1 – 1.5Mb/second stream to send the standard TV content, 5Mb/second if it is HDTV. If one switches channels, there is only about a 150ms lag. One stream can even handle picture-in-picture, because the image is composed in the server, not in the client side.

Microsoft will eventually be able to offer VOD. A movie is just another stream. It is not clear if Microsoft intends to create the storage and stream management, ad insertion, etc. that traditional VOD systems handle. At a minimum, Microsoft claims that they can work with "legacy" VOD systems.

A PVR function is also in the works. A PVR can be handled on the server side since all of the content is already stored there anyway (or at least, can be). This is because once a TV stream is encoded, the encoded content can be kept in a disk farm to be called up at any time. An obvious extension is TOD<sup>49</sup>, too.

Content comes from the traditional TV sources, but eventually can expand to include the Internet to create virtual Internet channels. Microsoft is not actively talking about this.

In a somewhat related area, **Sony** was showing some of their Passage<sup>50</sup> prototypes. Passage opens up digital cable to a wider choice of STBs and breaks the current duopoly that Motorola and Scientific Atlanta have. Charter signed up a year ago and Comcast signed last summer. Understandably, neither Motorola nor Sci-Atl has signed up, but other STB vendors, like LG have. The photo shows a Sony STB with two POD cards. While aimed at giving the MSO freedom to use legacy or new type Customer Premise Equipment (e.g. STB), it seems that if all MSOs signed up that the design can change for the TVs themselves – perhaps eliminating the need for POD slots and management.



Sony Passage STB

<sup>49</sup> TOD – like VOD, only TV on Demand – call up any TV show from the recent past to watch

<sup>50</sup> Sony Passage – allows multiple conditional access schemes over an multiple system cable operator's (MSO) system, requiring only a small overhead. See white paper - <http://www.sonypassage.com/white.pdf>

### Michael Powell Conversation – (Special Session)

Michael Powell, FCC Chairman, agreed last minute to an interview with Gary Shapiro (CEA Pres.). Here are some of the remarks:



- Lots of jokes about Powell's remark last year that TiVo was god's gift – this time he deliberately used the term "PVR"
- Media ownership – Powell felt people misunderstood what is going on with media ownership<sup>51</sup>. Powell feels that one should not look narrowly at just the television stations, for example. He says that people now have all kinds of other choices and that television is but a portion. Taken as a whole, he believes, there is still all kinds of competition out there that television has to compete against.
- Watch the kids – Powell advised people to "watch the kids" if you want to see what is going to happen with new technology.
- FCC role – Powell generally sees the FCC getting out of the way of progress, but stepping in to help the transition when necessary. Typically, if industry can't address an issue on their own, the FCC will then step in. "The burden of proof should be on the government on why it should regulate, not the innovator to prove why not regulate." He pointed to the Cable MOU as a fine example of industry addressing the problem.
- DTV – Powell said that the end of 2003 saw the "tipping point" for DTV. Shapiro agreed. Now that the tipping point has been passed, he adds, no telling how rapid the transition will be. Will it be by 2006? Who knows, but 2006 was never mandated – it was only a goal for when DTV reaches 85%. Will congress subsidize the digital transition by buying conversion boxes like they did in Berlin last year? No, he doesn't think Congress will do so.
- Wi-Fi – sees Wi-Fi as possibly the most exciting new thing happening today. Sites Wi-Fi as one of the reasons spectrum needs to be freed up from analog TV. The FCC is looking at ways to open up more license free spectrum. He adds, the FCC is "committed to throw wires out of the house." He is interested in spectrum that might have better wall penetration (this is usually the lower frequencies).

---

<sup>51</sup> Media ownership, or if you are against last year's FCC ruling, media consolidation – a controversial ruling that allowed ownership of more media channels in a given market. There is wide bi-partisan support to overturn this ruling. Rupert Murdoch and Clear Channel Communications are often the poster child bad guys in such arguments.

- Spectrum Management – Looking for smarter spectrum management. He said the old way is to treat it like a fixed lane road where everyone must get their own lane. The new way must recognize the newer modulation and spectrum utilization techniques out there.
- 3S – Powell said he thinks the three key things to watch are the three S – Silicon (miniaturization & CPU power), Speed (communications), and Storage. Pointed to "smart dust" example of small devices used to monitor grape vines.
- VoIP<sup>52</sup> – Powell feels very strongly that VoIP should be regulated as little as possible. He says there are people that say "it looks like a duck (phone), quacks like a duck, so regulate like a duck." This, he says, burdens VoIP with volumes of regulations that were written over the past hundred years – mostly around one company, he adds. If you over regulate VoIP, they will just pick up their server and put it in Italy. VoIP was probably going to be one of the major topic areas for 2004 in the FCC.
- Must Carry<sup>53</sup> – The FCC held back because they felt the industry was going to address it; but, now the FCC feels that it was not addressed adequately, so the FCC will step in.
- Two-Way PnP – Glad that the one-way Plug and Play came out, but now is anxious to see the two-way agreement.

#### Telco – Entertainment Partnership – (Session DH19)

Panelists were Jay Fausch (Sr. Director, Strategic Marketing, Alcatel Broadband Networking Div), Phil Corman (Director of Partner Bus Dev, Microsoft TV Group), Darcy Lorincz (VP, Global Rich Media Services, SAVVIS), John North (Director, Skyler Mgmt Group), Jonathan Hurd (VP, Adventis), Joe Lynan (CEO, PaymentOne), Josette Bonte (Mgr Dir, Broadband Serv, RHK).

Many Telcos are interested in offering entertainment services over DSL to expand into higher value offerings. Here some of the comments these folks made on what needs to happen.

- Alcatel – DSL dominates outside of the U.S., and pressure is high to expand beyond basic phone services. Fortunately, the telcos get to leverage the investments they've already made, so getting into entertainment is not seen as a major investment.
- Adventis – Feels that Telcos risk becoming a dumb fat pipe unless they find ways to work with other providers to create a smarter pipe. With the industry having invested \$18B in the infrastructure, video is the application

---

<sup>52</sup> VoIP – voice over IP (Internet)

<sup>53</sup> Must Carry – rules that tell a cable or satellite service provider to carry local channels.



that will get to use the capacity. The DSLAMs<sup>54</sup> are now able to handle the load. The last mile has been the bottleneck.

- RHK - Estimates 88 million broadband subscribers WW, Q2 2003. Does not feel that the infrastructure is holding back entertainment over DSL – it is a deal making issue between the industries. The entertainment and telco industries don't know how to work with each other. But, she sees that the two camps are getting closer. Also, she thinks that unlike the cable companies, some of the telcos now have money they can invest.
- PaymentOne – sees fastest payment option is to pin charges to the phone bill. Among other things, this company is behind the services that tell you "no credit card required" to sign up.
- Savvis – Has seen business issues go from banking/trading to security/reliability to entertainment. Telecommunication costs have gone dramatically down – they are paying about 8% the cost of 2 years ago. The cost of the infrastructure has gone from being 25% of their costs to 3%. He add that he thinks cable companies are in a proprietary box, whereas the telcos operate in the open Internet standards world. Mentioned that they have partnered with HP.
- Microsoft – admits that the first reaction they get from potential partners is "what is your secret plan – we know Microsoft is here to take over"

### Movie Distribution, the Broadband Timeline – (Session DH11)

Chaired by Phil Swann (CEO, TV Predictions, a newsletter I get<sup>55</sup>), Curt Marvis (CEO, CinemaNow), Jim Ramo (CEO, MovieLink), John Canning (Technical Evangelist, Windows eHome, Microsoft), Ian Ballon (Legal Parter, Manatt, Phelps & Phillips), Jody Stark, (Blast Radius), Rob Pait (Sr. Dir. Consumer Electronics, Seagate). Here are a few of the comments...



- MovieLink – They think that 20% of the market will watch "long format" content on a PC, and 80% would much prefer it on the TV. MovieLink is still serving the early adopters. Content selection is important. Also, to help to make the experience more immediate, they've made a big change to progressive downloading so one can start watching before the download finishes. They will be launching an even newer version next month. As far

<sup>54</sup> DSLAM – Digital Subscriber Line Access Multiplexer, the DSL switch that connects to the consumer.

<sup>55</sup> <http://www.tvpredictions.com/>

as concerns about copy protection, the DRM<sup>56</sup> has been holding up so far. Swann asked if the studios are trying to bypass the MSOs - MovieLink thinks the studios are trying to work with the MSOs, and not trying to bypass them.

- CinemaNow – Does not think it is an either/or type choice between PC and TV, but rather just an expanded choice of devices people can use. CinemaNow is now operating at break even, is looking for more funding, and thinks they will be profitable in 2004 (they started during the dot.com boom and have stayed alive while most everyone else died).
- Seagate – Key to any format is simplicity of getting content, and having control over the content.
- Microsoft – What's a PC? He tried to make the point that the PC doesn't have to behave or look like the PC of the past and that Microsoft is helping to move beyond the traditional form factors. The Media Center PC is no longer a "lean forward" experience.
- Legal – There are still uncertainties in the industry about how to avoid litigation from content owners, etc.

### "Getting it all Together" – (Session E1)

Moderator Aditya Kishore (Yankee Group), Bill Mannion (Proj Mgr, eHome, Microsoft), Joe Jensen (Bus Dev, Intel Communications Group), Lisa Pickelsimer (Dir of Video Product Development, Cox), Luis Avila (Dir. Strat Planning, Scientific Atlanta), Eric Scheelke (Pres, DigitalDeck).



This session was interesting because it brought a sample of people from a diverse set of areas in the value chain. Here are some of their comments...

- Yankee – sees the PC giving way to the "entertainment devices". Content is no longer tied to a specific type of device. Questions how important quality is to the user, pointing to how many consumers feel that an MP3 song is "high quality".
- Intel – Intel has set up 3 investment funds: 1) communications, 2) Centrino (WiFi), and now 3) digital entertainment. Intel invests in small companies hoping to fuel the industry, in this case companies that drive the ecosystem for "content moving". One key is standards. Intel is also interested in

<sup>56</sup> DRM – Digital Right Management. MovieLink uses Microsoft Windows Media and Real.

seeing the delivery of both commercial and personal content. Commercial content (mostly TV based) is blending with personal content (mostly PC based). Intel cautioned that companies need to look at what is happening outside the U.S. For example, there is more FTTH and IP delivery of content<sup>57</sup>. Living rooms are smaller so flat is more important. Wireless networking in smaller homes is easier.

- Cox – Sees STB functions moving into CE devices. MSOs want this to happen. The MSO gets to offer services without having to manage the STBs. They also would like to see modularity, so that new functions can be added without having to swap in a whole new box. Multiple functions in one box are OK as long as they are related to each other. MSOs don't necessarily want a "closed environment" – what they really want is to protect the content. They don't necessarily see Internet distribution as a threat because of QoS and latency problems. Therefore, they see it as a serving a niche.
- Microsoft – Constantly pushed the idea that the interface was the key. Consumers will find things useful and easy as long as the interface is consistent between devices and experiences. Thus, Microsoft is pushing to make all of its interfaces consistent, from phones to PCs to TVs, etc.
- SciAtl – Thinks there are three elements of the decision – functionality, simplicity and cost. Different market segments will rank each of these differently. In the future, there will be more "content consumption points", agreeing with others that content will find its way on a more diverse set of products and formats.

### Media Hub Strategies (Session DH22)

I was able to attend only part of this session because I chose to sit in another one first – too bad, this one seemed more interesting. Moderator Lisa Crane (Media Venture Advisors), Jeremy Toeman (VP Product Mgmt, Mediabolic), Joe Jensen (GM, Consumer Electronics Group, Intel), Ted Malone (Dir. Product and Service Marketing, TiVo), Keith Laepple (Tech Evangelism, eHome, Microsoft), Anthony Wood (CEO, Roku), Peter Kellog-Smith (VP, Prod Mktg, Diego), Scott Tandy (VP, Sales and Mktg, Digital 5).

- TiVo – customers are afraid that TiVo might go away so they are paying the monthly subscriber fee instead of the lifetime fee. Digital cable access is/was weak. Ted made a provocative comment – he claims that TiVo provides a central function to the home, and that it is not always appropriate to turn it into a "media center" by adding photos, etc. I'm not sure what he meant because TiVo is already starting to do this.
- Cox – 90% of the customers have the MSO do the hook up of the digital cable STB, even though it is easy to do. One advantage of an "all in one"

---

<sup>57</sup> FTTH – Fiber to the home. IP delivery – TV, etc., via DSL

type box is simplified connectivity for the consumer. This is one reason why the HTIB<sup>58</sup> products go well – the consumer feels confident that it will be easy to hook up.

- Roku – Anthony disagrees with why HTIB products sell well – he thinks it is because they are cheap and that no one is making any money off of them.
- Microsoft – "as content goes digital, more control can go to the content owners." This statement is counter to how teenagers think. I think that Keith was referring to how DRM can work.

### Broadband (Session E9)

This session was ho-hum, with perhaps a few interesting comments from Mark Jansa (Director, Internet Services, Best Buy).

- Best Buy expects to get 14 million new subscribers to various services in 2004. This is not just for broadband, but for phones, narrowband, etc. The offer services from 16 providers. MSN and Comcast are two examples.
- Best Buy's value proposition is "we make it easy to bring your devices to life." They are now trying to tailor and position services to different lifestyles. They want to do solution selling. It is not about "what it is", but "what it does".
- Jansa doesn't see the need for all the speed in broadband (an interesting comment). He thinks it is a way for the service providers to justify higher prices.
- Jansa thinks that single purpose devices with single purpose applications seem to make the most sense.

### Video Management & Content Distribution (Session DH21)

Only a couple of interesting comments from this session (I walked out to find a more interesting session).

- Mark Turner (BT Broadcast Services) – value is in the content. Money spent on production is money not spent on distribution because "distribution adds no value". Distribution is a "cost" and it doesn't make the content better.
- David Jensen (VP Bus Dev, Zetools) – talked about "Composite Media" where multiple sources of content are presented on the same or related screens. Zetools makes tools to help make such content. They also have something called "Media Value Management" to help sort out the content.

---

<sup>58</sup> HTIB – Home Theater in a Box, mostly consists of speakers and AV Receiver or amplifier, and sometimes DVD player and other components.

## Main Themes - Taking It All with You

This section covers an eclectic set of topics with the theme being portable devices. Sorry - less time was spent in this area, and next to no time was spent on phones.

### In the Home

Years ago an article came out in a San Francisco paper about [HP's ViewPad](#). This was a wireless monitor that worked with the PC. But, since the PC could also have a TV tuner in it, it turns out to also be a wireless TV, too. The ViewPad could sit in a stand and be used like a regular monitor with a regular keyboard – or the ViewPad could be lifted out and carried around the home. The ViewPad had a touch screen and soft keyboard so that surfing the web was possible, along with many other things one might do on the PC, except perhaps play rapid fire games.

HP never came out with such a product, but now others have. The [Philips DesXcape](#) actually came out last year, but I think I missed it then. Of the equivalent products, the Philips DesXcape looked the cleanest.

Stepping closer to the living room, [Sony](#) showed off their Location Free Television. This product used 802.11x to send the signal from a base station to the 12" SVGA monitor. The base station has a tuner and a connection to the Internet. Thus, the user can watch TV or surf the web.

Photos and MPEG1 video clips can be viewed on the monitor. The monitor has some built in memory, but also has a Memory Stick slot.

Images on the screen can be frozen with a press of a button. The image can then be printed via a printer connected to the base station via USB.



Philips DesXcape 150



Sony Location Free TV, with vertical base station in back

Sony claims that people will want to take the monitor with them to use when connected to WiFi hot spots. This is a little bit of a stretch.

A smaller handheld version is also in the works. They did not have a working unit of this version.



Handheld version of Sony Location Free TV



## Displays for Out and About



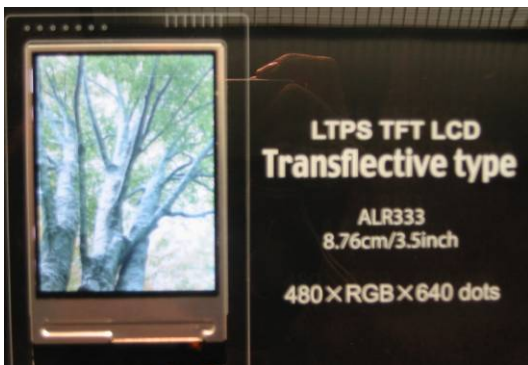
Creative Labs – Zen portable media center, based on Microsoft

And, from a small company called [Archos](#) comes the AV300, a modular gadget to end all gadgets. This product begins with the main display module with an 80 GB HDD for storing MPEG4 video content, music, photos and data.

The 80 GB version is \$899, while a 20 GB version is about \$500. You can snap on a camera module for taking 3 mega-pixel photos or 20 fps/QVGA videos (\$200). Or, you can snap on a module that lets you record TV programming off the air. Two other modules (not shown) are a memory card reader and an FM radio.



Archos – AV300 "cinema to go" (unit w/display), AVCAM (lower left), Digital video recorder (upper right)



The display to the left is a transfective display from [Sanyo](#). It has a built-in white LED for viewing in the dark, but since it is transfective you can view it in direct sunlight. Note the resolution and the size. It is giving color VGA resolution in a PDA size. One can actually see the difference in quality of the image, so small size does not mean one automatically must settle for QVGA resolution.

And since we are on the subject of components, here is Toshiba's smallest HDD. It will hold between 2 to 3 GB and cost in the mid-\$200s, and will come out sometime this year. Sorry for the fuzzy specs.



Toshiba 0.85" HDD

## Photo-Video



When people ask me what I saw at CES that I liked, I will think of one of the big screen LCD TVs; but if you ask me what toy I could afford to buy that I thought was clever, I think of the [Panasonic](#) D-Snap SV-AV50A, shown above. It has a very clever fold-out design.

The SV-AV50A is both a still and video camera, and it gets close to what I've been calling a photo-video camera – something that can take great photos and videos. Photos can be taken at 2 M-pixel resolution. Videos can be taken at pretty much full 30fps, 480 line resolution (480x702) in MPEG2, or QVGA in MPEG4. Here is a complete list of the video modes:

- MPEG2, 702x480, 30fps, 6 Mb/s (20 minutes on a 1 GB SD card)
- MPEG2, 352x480, 30fps, 3 Mb/s (40 minutes on a 1 GB SD card)
- MPEG2, 320x240, ?fps, 1 Mb/s
- MPEG4, 320x240, 30fps, 420 Kb/s (4 hrs, 40 min on a 1 GB card)
- MPEG4, 176x144, ?fps, 300 Kb/s
- MPEG4, 176x144, ?fps, 100 Kb/s

The sensor is a 2.11 M-pixel 1/3.2" CCD. No optical zoom, but digital zoom is 2.5x. (I think there is a flash, too) There may also be a way to record programs from the air. There is also a music playback (MP3, AAC) and memo taker mode.

Issues that will hold this type of product back are the viewing and preservation experiences. Since you must record onto expensive SD cards, the content must be transferred to the PC or equivalent storage. This means that the video must be viewed on the PC or somehow transferred into a form that can be viewed on the TV. Some Panasonic TVs have an SD card slot and can render MPEG4.

Dimensions are W48.9×H101×D20mm and weight is 103g (w/o battery and card). The base station has a charger and AV connection.

The camera is already available in Japan (36K Yen), but will be available in the U.S. in March for about \$400.



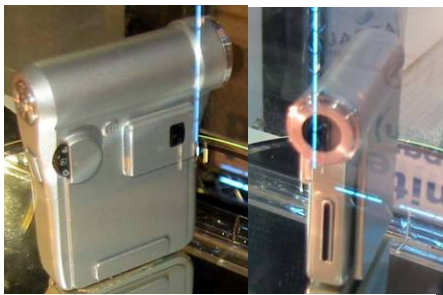
Sanyo FVD-C1

**Sanyo's** photo-video camera has actually been out for a little while (\$899), with Sears getting a small exclusive window (might be branded as "Fisher"). This window will expire this Spring.

This camera can take 3.2 M-pixel photos and VGA 30 fps MPEG4 video. Other video modes include QVGA 30 fps MPEG4 (3 M/bs), QVGA 15 fps MPEG4, and 176x144 15 fps MPEG4 ("web friendly"). One cute trick - you can take a VGA photos while you are taking video.

The camera comes with a 512 MB SD card, which explains the higher price<sup>59</sup>. 512 MB holds about 20 minutes of video.

Unlike the Panasonic unit, the Sanyo has a 5.8x optical zoom, with digital zoom that takes you out to 60x. The cradle allows USB2 file transfers and recharging.



NHJ DV-J

The camera to the left comes from **NHJ**, a Japanese company that has a few camera products. The model is the DV-J and it is supposed to come out mid-2004 and be priced "less than the Panasonic SV-AV50".

It has a 2 GB microdrive in it. This appears to be similar to their DV-4, but has a 3.2 M-pixel photo resolution instead of 2 M-pixel. Video is recorded in MPEG4, but I don't know at what

resolution or frame rate.

The DV-4 can accept an SD card. It can connect to the PC via USB2.

<sup>59</sup> At time of writing, a 512 MB SD card is priced at about \$250 - \$350



Samsung SCD6050

For people that don't mind a fairly clunky design, **Samsung** is going to introduce their SCD6050 in May for \$1K. The SCD6050 has a 5.24 M-pixel camera built under the lens of the Mini-DV camcorder. This model will be available in Europe. In the U.S. the SCD6040 will be priced at \$900, and will have a 4 M-pixel camera. I don't know the logic, but perhaps Samsung feels the U.S. market is more price sensitive.

The memory card is a 4-in-one arrangement, accepting both Memory Stick and SD cards. This product is not what I have in mind when I say Photo-Video.

Stepping into the traditional camcorder, **Sony** introduced several new mini-DV models. Shown to the right is the DCR-HC40, which has a 1 MP sensor for photos captured onto a Duo stick (smaller Memory Stick) and video capture onto tape. It is 25% less volume than the previous line (which was rather bulky side-to-side), add a new glass lens, transfective monitor (handy for outdoors), and smaller battery (they claim the electronics take up less power, so battery life is about the same). This camcorder is pretty much a complete redesign. The HC40 will go for \$700 in February. The HC30 (680k sensor) goes for \$600 and the HC20 (no photos) goes for \$500. These are much nicer than the older TRV line.



Sony DCR-HC40

Not pictured is Sony's PC-108 camcorder. This is very close to the existing PC-105 camcorder (vertical format). One of the more important things they did is move a sensor that was in the front of the camera to another spot that doesn't accidentally get covered up by your finger.

I did not look at the DVD camcorders. There was an interesting comment made by a Sony person – after Ophra showed one of the Sony DVD camcorders on her show last December, Sony couldn't keep them on the selves. Sony showed one of the higher end models and gave one to everyone in Ophra's audience that day. What seemed to make a difference, aside from being on Ophra's show, is that Ophra made a big deal to demonstrate how easy it was to use and playback. This type of demonstration is key to women buyers, say some experts (see section on the women's market).



**Sony** showed the DSC-T1, 5 M-pixel camera. This was announced late last year, but won't be available until February (\$550).



Sony DSC-T1



The first thing you notice about this camera is how slim it is. The slimness is done by turning the optical path 90° with a prism (Minolta did this earlier). The camera has a 3x optical zoom, but you don't have to see the nose pop out. One drawback is that there was no room for a tripod mount.

The second thing you notice is the large 2.5" LCD monitor (no optical viewfinder).

Third, you notice that the lens protector is a bit clumsy because you have to slide it down, not left or right. Once you figure it out, it is not too awkward.

The camera can take videos in MPEG1 format at VGA 30 fps. Everything is recorded onto a Duo card.

Inside they use a 1/2.4" CCD sensor. This is a fairly large sensor, and the camera would not be so trim if the optical path were conventional. It was difficult to see what the photo and video image quality was because the batteries were very low.

This camera comes closest to what I call a photo-video camera so far. My previous favorite was Canon's S400 (Canon did not introduce anything new at CES because PMA is coming up).



Sony 828

If you are into max-pixels in a prosumer format, Sony also showed off their 828, 8 M-pixel camera, with a 7X optical zoom lens and 4-color CCD arrangement. I did not spend much time looking at this camera. Sony introduced this camera last fall – since PMA is coming up, no doubt someone is going to up the ante.

On the other end of the scale, Sony showed their U50 series camera. These are 2 M-pixel camera that sell for \$249. The Sony U-series appears to be popular with women buyers.



Sony DSC-U50



## Other Stuff

Since we have moved into conventional digital cameras, here are a couple of new photo printers that came out.

**Olympus** has always had a bulky dye-sub photo printer. Now they have come out with a 4x6" dye-sub printer called the P-10 for \$200.

They claimed that prints cost less - 47¢ each (which includes the cost of the dye and paper).



Olympus P-10 and cartridge



Sanyo DVP-P1

The cartridge is shown on the right.

**Sanyo**, in turn, has a variation on the same print engine called the DVP-P1. This printer has slots for accepting memory cards. I think this came out last summer.

**Sony** introduced a higher capacity Mini-Disc, the Hi-MD and a Hi-MD Walkman. The Hi-MD holds 1 GB and costs about \$7. A disk holds up to 45 hours of music recorded in Sony's Atrac3 format. Sony previously had a 650 MB capacity version and the original was 140 MB.

Sony also has a service for downloading music from their library as well as Bertelsmann. Songs are 99¢.

Availability is in April.

The idea is that you may wish to put your music collection on swappable media instead of storing it on a HDD.

**HP** created a buzz by announcing they were going to support **Apple's** iPod. I got lots of people asking me what I thought of this decision. The move certainly will make Microsoft sit up, and gives a boost to Apple. My 16 year old son, however, thought it was stupid because "everyone knows it is really an Apple iPod inside."





InFocus LP120

The **InFocus** LP120 came out last year. It is a very trim XGA DLP projector, measuring about 2.1"x3.7"x9.8" and weighing about 2 pounds. It is priced \$2.7K. It also comes with a wireless accessory.

Tucked in a corner room were a set of **Samsung** Rear Reflecting Sound System (RRSS) speakers. What makes these unique is that

the tall column speakers have some side speakers that attempt to throw the sound to the back of the room to give a surround sound effect without having to place speakers behind you. The room was set up with an ideal spot to sit, but I have to admit that the effect was difficult to appreciate. The system comes with a microphone for calibrating the speakers to any room.



Samsung speakers

## Female Perspective to Shopping for CE – (Session SS8)

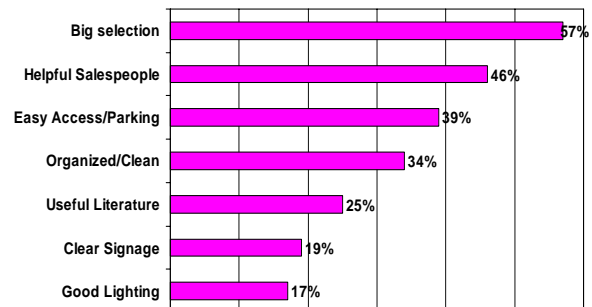
This is the second year CES has had this session. Moderator Laura Heller (Sr. Editor, DSN Retailing Today), Denise Yohn (VP, Corp Strat Mktg, Sony), Dave Williams (VP, Enterprise Research & Analysis, Best Buy), Katherine Rizzuto (VP, Marie Claire Magazine), Susan Stoey (WW Bus Research Dir., Kodak).

The following charts were shown by the moderator, Laura Heller (they may be from eBrain).

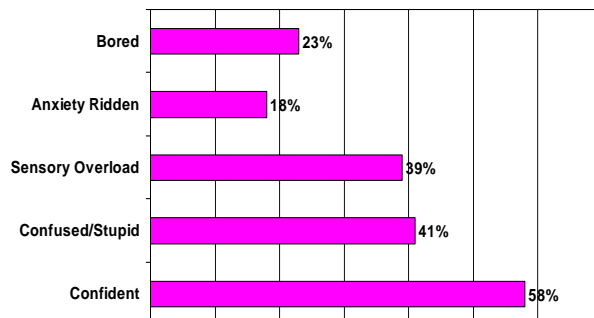
% Very confident in ability to make the right call buying...

	Women	Men
Cell Phones	44%	48%
Stereo equipment	27%	50%
Car Electronics	11%	35%
Computers	31%	51%
Printers	34%	48%
Video hardware	37%	45%
Digital Cameras	28%	38%

What do women want in a CE retailer?



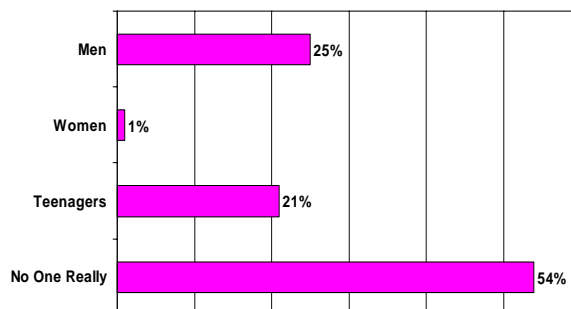
Women experience many emotions when shopping for CE



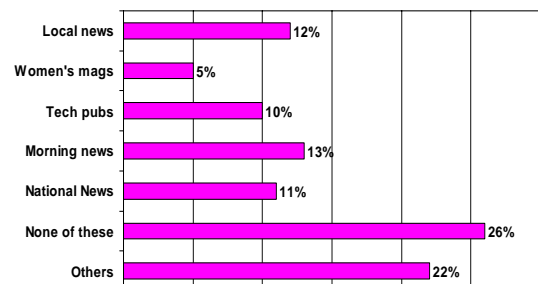
Information sources used to make purchase decisions

	Women	Men
Research product online	61%	70%
Talk to friends/family	53%	43%
Look for product reviews	39%	51%
Look at ad circulars	48%	37%

According to women, most CE products are designed for...



Women are getting new product news from...





The following are assorted comments...

- Laura added that women find salespeople unhelpful (74%) and pushy (71%). When women shop for electronics, they tend to be "on a mission". Women will shop alone only 27% of the time, and will shop with a female friend 41% of the time. 41% of women felt they need to bring a man with them to get any respect. Younger women feel doubly discriminated against for both age and gender. Products do not necessarily have to be designed in "pink" (or other "female colors") – it is a split decision on this, with some liking and some not liking this style.
- Best Buy – they have a segment they call the "entertainment enthusiast", and it used to be composed of 35% women, and now is 45% women. Men tend to want to build up their system over time, while women tend to want a total package. It is better to showcase by area then by manufacturer. Best Buy is talking to manufacturers and advertisers to coordinate programs. One theme is that "girls just want to have fun". Best Buy is also thinking of how best to show how things are put together, maybe even with some services. Best Buy also has a home in Las Vegas through which they do research.
- Marie Clare mag – Advises that CE companies look at the fashion industry for ideas. Advertise in women magazines, too (she had her own agenda here, of course). Women are concerned that they need to educate themselves before shopping, but need a salesperson to clear things up. But, the salesperson only gets them more confused. Marie Clare once ran an article on laptops and got 250,000 responses to the article. Finding that women are now interested in purchasing cameras, DVDs, etc. Phones used to be the item on the top of the list, but this has now been saturated. Phones and maybe cameras seem to be designed for women, but other products are not.
- It would be great to have a Disney movie running in the corner to distract the kids. Women with children only get to shop in 5 minute segments.
- Kodak – demonstrate the entire process to show what she can do. Kodak does studies to watch how women use the products. This has led to product design changes. For example, they timed men and women in the

out-of-box experience, and this led to the creation of quick setup guides. This addition cut support calls and reduced setup times.

- Partner for women only events. Suggestion was to have a special shopping day just for women with perhaps some celebrity there.
- Sony – Women are info seekers. They don't want products "dumbed down". It is important to explain how to use the product. The media (magazines, TV, etc.) can help here, too. A core need is simplicity. Sony likes to think of bundles.

Sony worked with Target (store chain) to design the Sony Live line products. This line is aimed at style conscious buyers and the products are displayed in a special section. They aimed these products at women.

The Sony U line of cameras was specifically aimed at women.

Sony is also targeting "Zoomers" – these are people in the third stage of adolescents. These are the "Boomers" that now find the kids have moved out of the house.

- The CE industry is where the auto industry was 20-30 years ago. "Remember when the husband would come home with a new car to show the wife?" Would this happen with cars today? It still happens with CE.
- Males write thick confusing manuals.
- Some recommended the book "The Science of Shopping"

### VC Views (Session DH13)

Moderator Allen Sussman (Partner, Morrison & Forester), Sun Jen Yung (Dir. Media Investment Banking, Deutsche Bank Sec), David Higley (Exec Dir. Digital Media, UBS Invest. Bank), Alexander Marquez (Strat Invest. Mgr, Media & Entertainment, Intel), Santo Politi (Partner, Charles River Ventures), Mark Stevens (Partner, Fenwick & West).



It seems that the VCs think things are turning around...

- The bar is higher these days, so if a company gets funding that company just went through a finer filter and stands a better chance. The hit rate on funding is still low. Typically looking for \$20-30 million/quarter profits before going IPO.
- In the summer of '03 a company could afford to wait to pursue an M&A, but now it is getting more expensive to wait, so companies are moving faster.



- There is still some "old money" that waited out during 02/03 that is now investing, but some limited partners are also trying to opt out. There is still a bit of "hangover" from 1999.
- Sectors looking interesting? Mobile applications, cable home entertainment systems, mobile games, WiFi, certain video games. As for games – royalties can be good, but predictability is bad, so invest in a wide portfolio. In Hollywood, some game developers are rep'd by talent agents, a model that is closer to the movie industry than the software industry. People are wondering if there is a bubble in Korean online games.
- Investing in HD content may get interesting in the future as the need for content grows (but pure content plays are difficult to predict, so maybe content aggregators are OK).
- Caution on trying to get between the MSO and the consumer – the MSO wants control. However, the satellite competitors are forcing new thinking.

### Useful links:

- <http://www.cesweb.org/> - official CES website
- <http://www.virtualpressoffice.com/CES/index.jsp> - listing of vendor press releases released at CES
- <http://www.ce.org/> - Consumer Electronics Assoc (CEA) website
- <http://www.mobiltape.com/shop/products.asp?strCategory=Technology&strShowName=Consumer+Electronics+Show+%2A+Las+Vegas+2004> – audio tapes of CES sessions can be purchased here
- <http://news.sel.sony.com/ces/> - Sony CES press kit site
- [http://www.panasonic.com/consumer\\_electronics/ces\\_2004/](http://www.panasonic.com/consumer_electronics/ces_2004/) - Panasonic CES site
- <http://www.sharppusa.com/about/AboutPress/0,1107,K39,00.html> – Sharp CES press releases
- [http://www.samsung.com/PressCenter/PressRelease/PressRelease.asp?seq=20040108\\_0000031487](http://www.samsung.com/PressCenter/PressRelease/PressRelease.asp?seq=20040108_0000031487) – Samsung CES press release (their CES 2004 website was down at time of writing)
- [http://www.lge.com/ir/html/ABboards.do?action=read&group\\_code=AB&list\\_code=PRE\\_MENU&seq=3697&page=1&target=pressreleases\\_read.jsp](http://www.lge.com/ir/html/ABboards.do?action=read&group_code=AB&list_code=PRE_MENU&seq=3697&page=1&target=pressreleases_read.jsp) – LG CES press release
- <http://www.ces2004.philips.com/> - Philips CES 2004 website
- <http://www.microsoft.com/presspass/events/ces/default.asp> - Microsoft CES press room
- <http://www.intel.com/ca/personal/news/ces2004.htm> - Intel CES Digital Home webpage
- [http://www.hp.com/hpinfo/newsroom/press\\_kits/2004/ces/](http://www.hp.com/hpinfo/newsroom/press_kits/2004/ces/) - HP CES webpage

## Glossary

1080i – HDTV resolution of 1080 x 1920 pixels, interlace scanned

480i – standard analog TV, usually 483x720, interlace scanned. DTV 480 is 480x640, progressive scanned (EDTV)

720p – HDTV resolution of 720 x 1280 pixels, progressive scanned

4C – Full name is 4C Entity. See CPRM and CPSA.

5C – Licensing group for DTCP.

802.11x – shorthand for 802.11b (original 11 M b/s, 2.4 GHz), 802.11a (54 M b/s, 5 GHz), and 802.11g (54 M b/s, 2.4 GHz). Other "x" variations exist.

1394TA – the TA is Trade Association. Sets standards for "Firewire" (Apple) or "iLink" (Sony)

AAC – Advanced Audio Coding, one of the newer audio compression formats (better alternative to MP3)

ACAP – (aka DCAP) Advanced Common Application Platform. A merged iTV protocol with roots in GEM, MHP, OCAP and DASE. ACAP-J is Java oriented, having roots in MHP. ACAP-X is XHTML oriented, and has some roots in DASE.

Analog hole – content owners don't want movies copied by equipment connected to the analog monitor signal

Anamorphic (anemographic) – stretches image to better fill screen, interpolating to emulate higher resolution

ASP – Average Selling Price

Aspect ratio – original TVs are 4:3 (1.33) while widescreen is 16:9 (1.77).

Movies are wider, often 2.35 (also 1.85, 2.55 & 2.76) so you still see letterbox bands on a widescreen set.

ATRAC3 – Sony's proprietary method for compressing music (alternative to MP3 and AAC)

ATSC – Advanced Television Systems Committee, U.S. DTV standards

AV – Audio Video

AVR – AV Receiver. The old "stereo" is now a multi-channel sound system for home theaters.

Broadcast Flag – when transmitted with digital content, will put certain restrictions on how the content can be copied, such as copy-never and copy-once.

CableCARD – card that allows access to conditional access digital cable. See POD and "Plug and Play"

CableHome – CableLabs try at defining how home networking should work (under their control)

CDN – Content Delivery Network

CE – Consumer Electronics (company)

CEA – Consumer Electronics Association. U.S. organization that represents CE mfrs.

CEATEC - Combined Exhibition of Advanced Technologies, sort of an equivalent on CES or CEBIT in Japan

CeBIT - Center for Office and Information Technology, biggest one is in Germany – sort of combination of Comdex and CES.

CEDIA – Custom Electronics Design & Installation Association – want an expensive home theater? Equivalent type organization exists within CEA.

CGI – Computer Generated Imagery

CGMS-A - Copy Generation Management System for Analog

Component Video – analog video is sent via three coax cables (RGB) for better image quality. Audio is sent separately.

Composite Video – old way of sending analog color video over one cable

CP – Copy Protection

CPE – Customer Premises Equipment. MSO term for an STB or modem

CPRM – Copy Protection for Recordable Media. CPPM for Pre-recorded Media. (4C)

CPSA – Content Protection System Architecture (4C)

CPTWG – Copy Protection Technical Working Group, MPAA & industry work out copy protection

CRT – Cathode Ray Tube, a dying technology

DASE – DTV Application Software Environment. U.S. proposed “HTML+” for iTV. See ACAP

DBS – Direct Broadcast Satellite. Example: EchoStar. Sometimes called Direct To Home (DTH)

DCMA - Digital Millennium Copyright Act. Europe’s equivalent is Copyright Directive 2001/29/EC

DENi – Digital Entertainment Network initiative. CE company initiative to standardize the way CE equipment talks to each other over Ethernet. See R7.6

DHWG – Digital Home Working Group. Recently formed by CE and PC manufacturers to sort out how CE and PC equipment should talk to each other

Digital Cable Ready – equipment complies with the digital cable "plug and play" requirements, so that with a POD, digital cable can connect directly.

Direct View TV – a type of TV where the image is formed on the plane that you are looking at, such as a CRT.

DLP – Digital Light Processor, T.I. DMD technology used in digital projectors

DMD – Digital Micromirror Device, the actual chip used in DLP

Duo – Sony's smaller version of their Memory Stick

DTH – Direct to Home, same as DBS

DPOF – Direct Print Order Format metadata for specifying how a photo should be rendered.

DPTV – Direct Projection (View) TV, also Digital Packet TV.

DRM – Digital Rights Management. Keeping content rights managed and avoiding pirates.

DSLAM – Digital Subscriber Line Access Multiplexer, the DSL switch that connects to the consumer

DTCP – Digital Transmission Copy Protection. Encrypted 1394 link that protects content. See DTVLink.

DTCP-IP – Same as DTCP but intended for Ethernet

DTT – Digital Terrestrial Transmission. Broadcasting DTV over UHF.

DTV – Digital Television. Does not necessarily mean HDTV.

DTVLink – CEA consumer term for a 1394 (775) connection for HDTV video

DVB – Digital Video Broadcasting, an open industry standards group for digital TV and data broadcasting.

DVB-ASI – traditional signal an MSO may use (the other is QAM)

DVI – Digital Video Interface, DVI-D is digital only, DVI-I accepts digital and analog.

EBU – European Broadcasting Union, working on standards – somewhat similar to SMPTE

ECMA-Script – version of Java Script adopted by the European Computer Mfrs Assoc.

EDTV – Enhanced Definition TV. 480p TV, often with 16:9 aspect ratios

EPG – Electronic Program Guide. Example: TV Guide. GemStar and Tribune are big players.

EIC 61883 – Defines how AV equipment should behave on 1394

ETSI – European Telecommunications Standards Institute.



Exif – Digital camera standard for specifying attributes of a photo, camera, conditions, etc.

Firewire – Apple's name for IEEE1394a, but then again, Apple invented it

FTTH – Fiber to the home

FPTV – Front Projection TV – a projector type of TV (a projector can be used for rear projection, too, if you have enough room behind the screen).

GEM – Globally Executable MHP. An iTV standard designed to extend MHP to non-DVB platforms.

H.26L – advanced variant of MPEG4 that uses wavelets instead of discrete cosine for compression

HAVi – Home AV Interoperability. Protocol for AV equipment “networked” on 1394

HDCP – High-bandwidth Digital Copy Protection. Encrypted DVI link protects content from being copied (EIA861a)

HDMI – High Definition Multimedia Interface, complements EIA861, DVI and HDCP for HDTV interconnection

HDTV – High Definition TV. Usually 720p (720x1280 pixels progressive), or 1080i (1080x1920 pixels interlaced). Monitors may claim HDTV resolution and yet have other resolutions, such as 768x1024.

HDTV-Ready – can mean all kinds of things, but that at least an unencrypted HDTV signal will be displayed on the screen. Does not necessarily mean that 1) the image is at the intended HDTV resolution, or 2) an encrypted signal will be displayed properly.

HighMAT – Microsoft's (they worked with Panasonic) version of formats aimed at organizing multimedia content. See MPV.

HTIB – Home Theater in a Box, collection of AVR and speakers, sometimes DVD and other components to complement a big screen.

IBC – International Broadcasting Convention – Europe

IETF – Internet Engineering Task Force

IHDN – In Home Digital Network, an approach by DVB to describe a 1394-based network. See IPI.

Interlaced – (As in 480i and 1080i) each scan consists of either all the odd or even lines. Original analog TV is interlaced because it took less bandwidth. See progressive.

iLink – Sony's name for IEEE1394a

IP – Intellectual Property or Internet Protocol.

IPI – IP Infrastructure, effort started by DVB to address IP traffic on 1394-based network.

IPG – Interactive Program Guide (fancy EPG)

IPTV – Microsoft's TV over IP (Internet Protocol) scheme

IR Blaster – method of transmitting IR remote control codes to other devices so that one device can control another device.

Isochronous – data must travel at a predictable constant rate. Video usually needs isochronous transmission.

Jaggies – on interlaced TVs moving objects produce edges with jaggies because part of odd lines of the image are painted at a different time than the even lines of the image.

LCOS – Liquid Crystal on Silicon. Very new way to make a reflective image engine for TVs and projectors.

MD – Sony's MiniDisk, aimed mostly at music. Various capacities exist.

MHP – Multimedia Home Platform (Europe's version of DASE) for iTV. OCAP started with MHP designs. See ACAP.

MOU – Memorandum of Understanding. Sometimes short hand for the Cable-CE "Plug and Play" MOU agreement.

MPAA – Motion Picture Association of America. Represents the seven major studios.

MPEG – Motion Pictures Expert Group. MPEG1 is the original, most pervasive, but less efficient version. MPEG4 is newer, more efficient, and getting a bit more common. MPEG7 is search & management. MPEG21 is "Multimedia Framework". All kinds of variations exist within each of these standards.

MPV – Music-Photo-Video (originally Multi-Photo-Video) HP originated version of formats for organizing multimedia content. See HighMAT.

MSO – multiple system operator (some say multiple service operator), aka the cable company.

NAB – National Association of Broadcasters – U.S.

NTSC – National Television Standards Committee (U.S. type analog TV), aka "never the same color"

OCAP – OpenCable Application Platform. Built on MHP, but CableLabs' version for controlling devices in the home. See ACAP.

OLED – Organic Light Emitting Diode. Very new type of display that emits light like a LED but uses organic materials, making it potentially affordable.

OpenCable – Attempt for self provisioning of STBs, which so far has failed.

OSD – On Screen Display, such as might be used for showing status of something over the video picture. Can sometimes be referenced as a "trick mode"

PAL – Phase Alternation Line – European analog TV standard

Passage – Sony's system for sending encoded data of two different digital cable conditional access schemes over the same cable with relatively low overhead.

PDP – Plasma Display Panel

Plasma – Plasma TV panels. Color is formed by phosphors excited by electrons in each cell.

Plug and Play – within the TV industry, has to do with a Digital Cable Ready box and nothing to do with Microsoft

PVR – Personal Video Recorder. Sometimes called Digital Video Recorder. Example: TiVo or ReplayTV.

PacketCable – A move to packetize cable, which for video is now switched.

PMA – Photo Marketing Association. Deals mostly with photography, and now digital photography

POD – Point of Deployment. Card (CableCARD) that acts as a key that you slip into a STV or TV to give access to conditional access cable TV content.

PPV – Pay per View. A modestly successful service only.

Progressive – (as in 720p) every line of the image is painted each scan. Shows crisper moving objects without jaggies.

Pro-MPEG – standards group working on interoperability of broadcast systems

QAM – Quadrature Amplitude Modulation, fairly efficient RF modulation technique that can be used in digital cable. 256 QAM = 8 bits/symbol

QoS – Quality of Service. Getting the bits where you want them, when you want them, in the right order.

R7 – R7.5 CEA's standards body for AV Networking around a cluster. R7.4 extends this to the home backbone. R7.6 is based on DENi.

RCU – Remote Control Unit.

RGB – Red Green Blue. See YCrCb

RPTV – Rear Projection TV. Originally CRT-based, but newer sets are LCD, DLP or LCOS based.

SCART – European connector standard for AV, which can also contain some control signals, too.

SD – Secure Digital. A small form factor digital media card that competes head on with Memory Stick. A smaller version is being worked on.

SDI – Serial Digital Interface video (270 Mb/s) – standard digital format in production

SDTI – Serial Digital Transport Interface (25 – 50 Mb/s) – compressed variant of SDI for up to 4x real time

SDTV – Standard Definition TV. Lowest resolution, roughly equivalent to VGA. (IEA775)

SFX – Special Effects

SMPTE – Society of Motion Picture and Television Engineers (U.S.)

STB – Set Top Box. Connects to MSO or DBS service for delivering digital TV service

SVideo – analog video connection scheme for composite video

SVOD – Subscription VOD. Like VOD, but the customer pays a subscription to gain access to a library rather than a per-use fee.

Telecine – machine that digital scans film

TOD – Television on Demand. Like VOD but the content is recent TV programming.

UDDI – Universal Description, Discovery and Integration, a web-based database standard for finding services.

UPnP – Microsoft's "open" standard for how devices on a network are discovered and interoperate. UPnP 1.0 and 2.0 have big differences.

UWB – Ultra-Wideband, time/phase domain oriented spread spectrum wireless for high bandwidth, short range communication.

VHN – Versatile Home Network, EIA851. First version of CEA R7.4, but currently being gutted by new members.

Video Tricks – adding OSDs, fast forward, pause, rewind, etc.

VOD – Video on Demand. Call up a movie, watch it, pause, fast-forward or rewind, for a fee

VoIP – Voice over IP (Internet Protocol), one of today's hot topics – build a phone system around IP protocols instead of old fashion "switches".

W3C – Worldwide Web Consortium

WEP – Wired equivalent privacy – a way to encrypt content sent over 802.11x. Everyone is working on alternatives.

YCbCr – Luminosity(Y)/Red-Y/Blue-Y an alternative digital color space to RGB. YPbPr is similar for analog video. See YUV.

YUV – some component video uses YUV instead of RGB. YUV is used because it affords some bandwidth efficiencies.



Gates with Leno during keynote



Biggest emptiest booth at CES



Fumio Ohtsubo during Panasonic keynote

Please send suggestions, corrections and networking opportunities to [gary.sasaki@digdia.com](mailto:gary.sasaki@digdia.com)

Thank you.

This document can be downloaded at: <http://digdia.com>



HP booth

Sony Booth