

Consumer Electronics Society

Newsletter

Fall 2011 ■ Number 3



From the President

Stephen Dukes
President, Imaginary Universe, LLC
stephendukes@ieee.org

IEEE Consumer Electronics Society Conference Growth

The IEEE CE Society served as a technical co-sponsor of the 1st International Conference on Consumer Electronics, Communications and Networks (CECNet) 2011 in Xianning, China in April of 2011. Larry Zhang, past President of the IEEE CE Society served as the General Chair of the conference. Thomas Coughlin, Vice President of Operations and Planning and myself participated in the CECNet 2011 conference in April of 2011. The CECNet 2011 conference was well attended. We had the opportunity to meet with professors from Xianning University and delegates from Taiwan who were interested in CE Society activities. The CE Society has significant interest in growing its presence in China with the establishment of new chapters and conferences. We are working towards ensuring that these conferences will be compliant with IEEE requirements. The scope of the conference was on consumer electronics, communications and networks.

The IEEE CE Society will serve as a technical co-sponsor and I will serve as the General Co-Chair of the 2nd International Conference on Consumer Electronics, Communications and Networks (CECNet) 2012 conference in Three Gorges, China in April of 2012. Joe Lillie, a prominent member of the IEEE, has agreed to serve as Technical Program Committee Chair. We have well known industry executives that will contribute as keynote speakers for the conference. The CE Society will also serve as the technical co-sponsor of the 3rd International Conference on E-Business and E-Government (ICEE) 2012 to be held in Shanghai, China in May of 2012. The intent of the participation is to create new chapters in each location where conferences are held and continue to grow the IEEE CE Society in China.

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<http://ewh.ieee.org/soc/ces/>

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2011 CHAPTER CHAIRS 2011 IEEE CONSUMER ELECTRONICS SOCIETY ADMINISTRATIVE COMMITTEE

BANGALORE SECTION CHAPTER
BHASKAR J KARMAKAR
bjk@ti.com

BEIJING SECTION
DONG LIU
dliu@biigroup.com

DALLAS SECTION CHAPTER
WILLIAM LUMPKINS
xillia@yahoo.com

GERMANY SECTION CHAPTER
HANS L. CYCON
hcycon@fhtw-berlin.de

GREECE SECTION CHAPTER
ATHANASIOS KAKAROUNTAS
a.kakarountas@gmail.com

HONG KONG SECTION CHAPTER
BERNARD C FONG
bfong@ieee.org

KANSAI SECTION CHAPTER
TADASHI SAKAMOTO
tadashi.sakamoto.gx@renesas.com

OTTAWA SECTION JT. CHAPTER
WAHAB ALMUHTADI
almuhtadi@ieee.org

PHILADELPHIA SECTION JT.CHAPTER
GAIL L ROSEN
gailr@coe.drexel.edu

PORTUGAL SECTION JT. CHAPTER
JORGE R FERNANDES
jorge.fernandes@inesc-id.pt

PRINCETON-CENTRAL JERSEY SEC. JT. CHAPTER
NARAYAN L GEHLOT
gehlotn@gmail.com

RUSSIA (NORTHWEST) SECT
DMITRY A TKACHENKO
dtkach@mail.wplus.net

SAN DIEGO SECTION CHAPTER
YUNJUN BRIAN ZHANG
yunjun.zhang@gmail.com

SAN FERNANDO VALLEY SECTION CHAPTER
SHARON PENG
sh_peng@yahoo.com

SANTA CLARA VALLEY SECTION CHAPTER
MICHAEL C WANG
michaelwang@mxic.com.tw

SEOUL SECTION
CHANG-SU KIM
chang sukim@korea.ac.kr

SERBIA AND MONTENEGRO SECTION
MIHAJLO KATONA
mihajlo.katona@rt-rk.uns.ac.rs

SINGAPORE SECTION CHAPTER
PRAMOD K MEHER
pkmeher@i2r.a-star.edu.sg

SUSQUEHANNA SECTION CHAPTER
ALDO MORALES
awm2@psu.edu

TAIPEI SECTION CHAPTER
TIHAO CHIANG
thchiang2k@gmail.com

TOKYO SECTION
NAOTO HAYASHI
hayashi.n-gm@nhk.or.jp

UKRI SECTION CHAPTER
EZENDU I ARIWA
e.ariwa@londonmet.ac.uk

VANCOUVER SECTION CHAPTER
SHAHRIAR MIRABBASI
shahriar@ece.ubc.ca

Term Expires 2011
Robin S. Bradbeer
VP of International Affairs
City University of Hong Kong
Department of Electronic
Engineering
Hong Kong

Tomohiro Hase
VP of International Strategy
Ryukoku University
Department of Media
Informatics
Faculty of Science and
Technology
Seta, Otsu 520-2194, Japan

William Lumpkins
Standards, Technical Activities
Chair
Wi2Wi Inc.
2107N, 1st Street, Suite 540
San Jose, CA 95131

Wayne C. Luplow
ATSC Representative
Zenith Electronics
2000 Millbrook Drive
Lincolnshire, IL 60069

Brian Markwalter
CEA Liaison
Consumer Electronics
Association
1919 S. Eads Street
Arlington, VA 22202

Term Expires 2012
Tom Coughlin
Vice President for Operations
and Planning
Coughlin Associates
1665 Willowmont Ave
San Jose, CA 95124-3234

Stefan Mozar
Vice President of
Conferences
University of Western Sydney
Australia
44 Meurants Lane
Glenwood, NSW
2768 Australia

Sharon Peng
Awards Chair
Harman International
8500 Balboa Blvd.
Northridge, CA 91329

Simon Sherratt
Transactions on Consumer
Electronics Editor
The University of Reading
School of Systems Engineering
RG6 6AY, UK

Kyle Wiens
Membership Chair
iFixit
9393 Eagle Vista Way
Atascadero, CA 93422

Term Expires 2013
Narisa Chu
CWLab International, Ltd.
3338 Prairie
Thousand Oaks, CA 91320

Peter Corcoran
Newsletter/CE Magazine Editor
National University of Ireland,
Galway Galway, Ireland

Nahum Gershon
The Mitre Corporation
7515 Colshire Drive
McLean, VA 22102-7538

Richard S. Prodan
BROADCOM Corporation
Longmont, CO

Tom Wilson
Secretary/Governance
Phorusgasse 8/6
1040 Vienna, Austria

Ex-Officio Members
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President
Stanwood, WA

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ICERA
Richardson, TX

Peter Clout
Division IV Director
Vista Control Systems, Inc.
2101 Trinity Drive, Suite Q
Los Alamos, NM 87544-4103

Scott Linfoot
Treasurer
De Montfort University
Department of Engineering
Queen's Building
The Gateway
Leicester UK LE9 1BH

Stuart Lipoff
VP of Publications
IP Action Partners
192 Kirkstall Road
Newton, MA, 02460

Charlotte Kobert
CE Society Executive
Administrator/
Coordinator of Conferences
4115 Clendenning Road
Gibsonia, PA 15044

CE SOCIETY NEWSLETTER EDITORIAL BOARD

Editor
Peter Corcoran, cesmagazine@gmail.com

Associate Editors
Stefan Mozar, s.mozar@ieee.org
Tom Coughlin, tom@tomcoughlin.com

Stu Lipoff, stu@lipoff.org
Samad Ahmadi, sahmadi@dmu.ac.uk

IEEE Consumer Electronics Magazine Deadlines

<http://mc.manuscriptcentral.com/cesmag>
Dec 31 - Spring, 2012
March 31 - Summer 2012
June 30 - Fall 2012
Sept 30 - Winter 2012

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From the President *continued from page 1*

The strategy of the CE Society is to couple the new conferences alongside existing, successful international consumer electronics shows, a formula that has been highly successful with the International CES show held annually in Las Vegas each year. We have two new conferences that will ensure a CE Society presence at two major CE shows. The ICCE – Berlin 2011 conference is being held in tandem with the IFA show in Berlin, Germany in September and the GCCE 2012 that will be held in association with the CEATEC in Japan October 2012, outside Tokyo.

Each of these conferences will be held annually. Association with consumer electronics trade shows is a useful construct for attracting engineers and technical individuals interested in the shows to our conferences.

The ICCE – Berlin held in Europe and GCCE held in Japan, will complement the ISCE Conference that is held in countries around the globe. The site for the ISCE is selected by the Chapter Chairs. The ISCE for 2011 was held in Singapore. Next year the ISCE 2012 will be held in Harrisburg, Pennsylvania, USA.

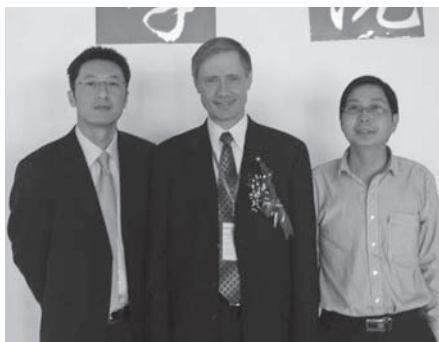
The ISCE 2011 Singapore Conference was chaired by Nicholas Van successful. Following the conference, a tutorial was held and well attended. The R10 Chapter Chairs met under the auspicious of Dr. Robin Bradbeer, Vice President for International Affairs during the ISCE 2011. Another similar meeting is scheduled for those that did not attend the meeting in Singapore.

At the Singapore ISCE 2011, Taiwan was selected as the location for

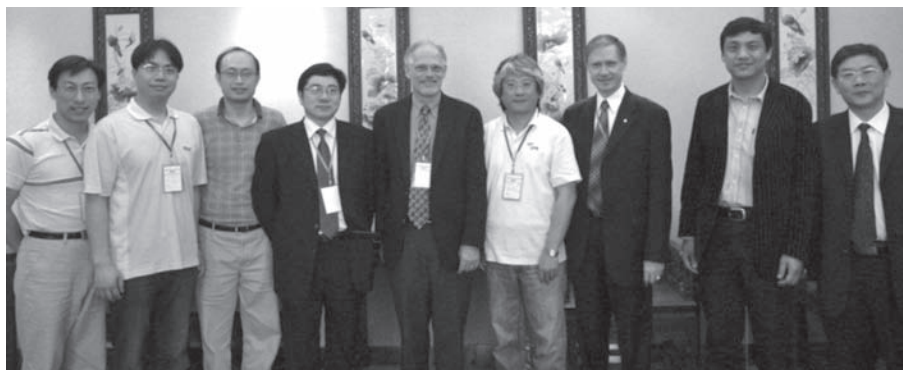
the ISCE 2013. The conference will be held in Hsin-Chu, Taiwan, an area with over 400 technical and manufacturer companies, along with three universities, i.e., National Taiwan University, National Chiao Tung University and National Chung Hsing University. We are excited with the opportunity to hold the conference here in Hsin-Chu, Taiwan.

We are planning two other regional conferences, within the next year or two, one, possibly, in India. The discussions associated with a conference in India come after only one year of establishing our first CE chapter in India. Dr. Robin Bradbeer, Vice President, International Affairs and Dr. Tom Coughlin, Vice President, Operations and Planning traveled to

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Xianning, China: CECNet 2011 Conference organizers Dr. Jiao Feng (to left), Dr. Feng Liu (to right), with CE Society President, Stephen Dukes.



Xianning, China: left to right: Members of the Taiwan delegation, Tom Coughlin, Stephen Dukes, Professor Gengyu Cao, and Professor Wu Jiliang, Vice President of Xianning University.



A group shot of all delegates at the CECNet 2011 conference in Xianning, China.



FROM THE EDITOR

By Peter Corcoran

Hi CE Society Members, it has been a really crazy few weeks for me. My deadlines for CE Newsletter just happened to overlap with a week's visit to Romania so I had a lot of mini-crises getting ready for this issue. Also it doesn't help that we'll have deadlines for the first issue of CE Magazine next month so I'm running from one set of fire-drills to another, but more on that later. Also more on that Romanian trip and some more musings from the Google Generation (remember them)...

So after loading most of the mission critical files from my home desktop computer onto my trusty Mac powerbook – unfortunately I am not fully cloud-enabled just yet – I was ready to set off on my trek around one of the most beautiful mountain countries in Europe. But first some sad news...

Bye-bye Newsletter....

Yes, this is the last edition of your favorite newsletter. I've only been doing this job for 12 months, but time flies and already it is time to say good-bye. We've had an interesting year in the CE industry, an interesting year in our CE Society but now it is time to move on. But before we do that, perhaps a few reminisces on the past year.

My first issue of the Newsletter was the **Winter 2011 issue** which was released (in electronic format) in early January, just in time for ICCE 2011. A strong emphasis was placed on our society strategic plan by president, Stephen Dukes. Naturally there was a range of material on ICCE 2011, including a focus on our conference patrons and on invited sessions. There were also articles on the distinguished lecturer program, on our new Bangalore chapter and a historical perspective on 3D.

In the **Spring 2011 issue** we saw an extensive article from president Dukes who devoted some of his time to a comprehensive visit to Japan to foster relations with various technical bodies and representatives of the CE industry. As part of society strategy this will help grow our participation in more International conferences and the development of our primary ICCE branding for the CE society's conference activities. This issue also featured a detailed retrospective on ICCE 2011 with many pictures, thanks in particular due to Jim Farmer, former editor of the Newsletter. This issue also featured several technical articles – part of our evolution towards the CE Magazine: "Angels in our Midst", by Tom Coughlin reminded us of the problems of tracking data as we move towards the era of "cloud computing"; "Time to Get Serious with Interactive TV", by Stu Lipoff reminded us that next-generation TV is on its way; finally "A Bitter Pill, or a Better Tablet" traces the history of tablet computing and the roots of the astonishing success of the iPad.

The **Summer 2011 issue** follows with a focus on the IGIC 2011 conference to be held in Southern California – the International Games Innovation Conference (IGIC) is only 3 years old, but has already captured a somewhat unique niche between academia and industry. This issue also highlighted one of IEEE's priorities for 2011 with a detailed article on Cloud Computing. If you need to get up to speed with the world of "Cloud Computing" I recommend this excellent overview of the field. Another priority area for IEEE in 2011 is highlighted in a new section "Smart-Grid Round Up"; a second new section, "CE News Bytes" has a

focus on the latest news stories in CE; note that as we transition to the CE Mag I am looking for associate editors to take over these regular sections of the Magazine. (Please contact cesmagazine@ieee.org if you'd like to take on one of these opportunities.)

And there you have the short, bittersweet history of CE Newsletter under my editorship. It was fun, but sadly is already over ... but there is happy news to end this tale!

Hello CE-Mag!

The truth is that I was originally appointed by Adcom to run the CE Magazine but it later emerged that it would take a while for wheels of IEEE publications to start turning. In the meantime it seemed like a good idea that I'd begin to cut my teeth on the Newsletter.

Well, finally, after more than a year and a half I am in a position to announce that we are close to being ready for the first issue of CE Magazine. Very close in fact, because as I close this issue of the Newsletter, my deadline for the first issue of the Magazine is less than a month away! We already have some good content in place, but I do need more. Lots, lots more.

You will find several calls for papers/articles in this and previous issues of the Newsletter. Also, in a separate section, below you'll find my editors quick-start guide to content for the magazine. And if you'd like to propose a special call for papers just mail me with some details of your suggestion at cesmagazine@ieee.org.

Writing Articles & Content for CEMag

CE Magazine will be a full IEEE Magazine and each issue will appear in IEEE Xplore. This implies that all content will be available to

subscribers of IEEE Xplore so your articles and submissions will reach a far wider audience than the members of our IEEE society.

The quality and presentation of this content will, in turn, reflect on us, as a society, and bearing this in mind, I intend to keep material topical and of high quality. In turn, I expect that many of our articles will attract external comment and citation. Thus as a CE Society member I would ask you to consider writing a short article or review to share your experiences and knowledge with your fellow society members. In particular for those of high achievement and responsibility there is an even stronger mandate to share your experience and expertise.

In many instances this may not even take a great deal of work – you may already have written reports or have students who have completed literature reviews, or perhaps you've completed a technology or product evaluation within your organization. All that may be needed is some internal approval process to release the relevant material for external publication.

In all such cases I am more than happy to provide supporting letters and I am also happy to publicize, acknowledge and promote the contributions of your organization to the CE Society and the IEEE. (But advertising is NOT free!) If you have any questions or would like to discuss possible articles please contact me (cesmagazine@ieee.org) to discuss.

Solicit an Article or Content

Another approach to getting interesting articles is to simply ask people – if you have read some interesting article recently and you think that it would be of interest to CE Society members we can simply ask the author if they would be interested in reaching a wider audience – many authors are delighted to customize an earlier article, or provide a revised or updated article. So if you have read some interesting



articles recently please feel free to approach the author on behalf of your Society, or if you prefer give me some reference to the original article and an e-mail contact for the author.

You may also have peers or colleagues who are working in a field of interest to CE Society members. They may be willing to provide an article on a topic relevant to CE. We will shortly have an active Web-Site on ScholarOne for submitting content: <http://mc.manuscriptcentral.com/cemag>.

Some Ideas for Potential Articles

Here is a short list of suitable topics for articles that may be of interest to your fellow CE Society Members:

- i) Local Chapter & Chair Events and Activities;
- ii) IEEE conferences & workshops – particularly those sponsored by CE Society;
- iii) Literature/Technology Reviews which are CE relevant – e.g. derived from a PhD student's thesis work;
- iv) Major CE Industry events and trade shows
- v) Tutorials/Evaluations of new CE-relevant technologies
- vi) Reviews of Topical Industry Trends (e.g. see this month's arti-

cle on Cloud Computing, inspired by the theme of ICCE 2012)

vii) Historical Articles relating to recent Industry Trends (e.g. see recent articles on Tablet Computing and 3D Cinematography)

viii) Future Vision articles on trends in a particular CE Industry sector

In this Issue

This issue we have another wide mix of articles. Note that many of these sections will pass over to the CE Magazine so you'll still find much of the Newsletter will live on in CE Magazine.

We open with a detailed article from CE Society President Stephen Dukes. This time he has been visiting mainland China, Taiwan and Korea, attending some conferences, meeting with a range of Universities, technical organizations and conference committees. Stephen is certainly setting an example for us all in his mission to advance the CE Society's strategic plan by growing our membership and participation in conferences. You'll find other prominent Adcom members mentioned in Stephen's article, notably Tom Coughlin and Professor Tomohiro Hase.

After this you have my Editor's Notes section with a focus on the new CE Magazine. This is followed by an article on "Intellectual Property" by Conor Boyce. Conor is a senior partner at FR Kelly, a prominent Irish Patent Law Firm. I'm hoping to have a regular column on Patent and Intellectual Property issues as they refer to consumer electronics. If you have questions or an interest in certain aspects of Intellectual Property Law please let me know and I'll try to get you an answer.

The next two articles focus on two upcoming conferences that IEEE CE Society is involved with in September and November 2011. The first is the newly launched **ICCE-Berlin 2011** that is co-located with **IFA Berlin 2011** – the world's leading business event for consumer electronics and home appliances products. The

second focus is on **IGIC 2011** which was also featured in the last issue of the Newsletter. You'll find updates on speakers and special events at each conference.

Our main article this month is actually a double reprint of a set of articles which originally appeared in the April and May 1979 issues of Practical Computing. These were interviews with Steve Wozniak and the journalist in question was Robin Bradbeer from our Adcom. Robin is VP of International Affairs for CE Society and we also have a short biographical sketch. I'll be featuring other members of the Adcom from time-to-time. It is interesting that Apple have now grown to be the No.1 innovator in the consumer electronics industry. I hope you enjoy this trip back down memory lane and if you have been involved in similar historic events please feel free to write about the and share with your colleagues.

This article is followed by **CE News Bytes** – a new column I started last issue. Again, for the CE Magazine I am looking for a volunteer Associate Editor who would take on responsibility to compile such an assortment of CE news items on a regular basis. If you are interested please contact me at cesmagazine@ieee.org. A tear-down and device profile of the new iPad2 follows. This is based on "tear-down" information obtained from the iFixit website: <http://www.ifixit.com/>. A special thanks to Kyle Wiens for giving permission to use this material. And if you like this tear-down then tell me so we have more of them in the future. This is followed by **Smart Grid Round-Up** which this month has a focus on the members of the CE Society smart-grid committee. Again I've reprinted an article with interest for CE people from the June IEEE Smart Grid Newsletter.

More on the Google Generation

I wrote in an earlier issue about my somewhat over-connected kids and coined the term the *Google Generation*

for them. Somehow they seem to move from one new adventure to another without much help or input on my part.

Recently my eldest daughter (8) made the mental breakthrough that the computer is a separate entity from the Internet! This revelation partly occurred because I was away from home and my wife didn't know how to reset the router, hence several days of Internet deprivation ensued. However the full background story is a little longer and starts with an interactive "virtual world" game called *Minecraft* <http://www.minecraft.net/>.

This game is focused on creativity and building, allowing players to build constructions out of textured cubes in a 3D world. The game starts by placing the player on the surface of a huge procedurally generated game world. The player can walk across the terrain consisting of plains, mountains, caves, and various water bodies. The in-game time system follows a day and night cycle. Players can "mine" different resources and "craft" tools, weapons, armor, food, and various other items from these.

OK, the kids didn't find out about *Minecraft* on their own – my older son who is completing his college degree thought it might be a bit like a "virtual game of Lego" for them. Boy he sure had his fingers on the pulse there...

My kids have gone crazy about this game. They learned the basics quite quickly and soon advanced to building more complex structures. They also found a YouTube channel that has video tutorials on how to build and craft a range of more complex tools and structures. Then they contacted their older brother by Skype to organize multiplayer games. Now even my 4 year old son knows how to build underground mines and knows about finding rarer minerals to build stronger armor & weapons – well he is a boy; the girls prefer to set up a market and trade with other players!

I guess my point here is that my kids figured all of this out with just a small nudge from their older brother. After some initial disputes

they learned to share know-how and teach each other new skills to the point were even the 4 year old is quite skilled and competent in this gaming world. I don't know how long this phenomenon will last – it started about 6 weeks ago – but I do know one very positive benefit. My kids don't watch the Disney channel any more – it just has not got what it takes now that they discovered their first "interactive" world!

Travels in Romania

I mentioned earlier that most of this issue was put together while on the road. For those who are interested I was traveling in Romania, one of the most beautiful countries in Eastern Europe, if not the World. Fortunately it also has excellent Internet connectivity so even though I was moving around all the time I was always sure of good network connections.

I began with a visit to the country house of a friend of mine, way up in the mountain valley of Voineasa. This is an unusual location as much of the valley is part of a large hydro-electricity scheme and there are at least 3 major dams on the road to Voineasa. However it has the great advantage that the road has to be kept clear of snow in Winter. And when you get to the top of the valley you can appreciate the peace and quiet of the Romanian countryside.

Funny enough, though, my friend has a 100 Mbps connection in his remote country house. This is very typical of Romania – the peace and idyll of two generations ago, combined with today's technology.



Bucharest Old Town.

For Monday I traveled to Brasov, nestled in the Carpathian mountains. This is another beautiful town with a historic center second to none. I've included an aerial shot of the town and some pictures to try and give you a feeling for the medieval nature of the town. But here I was visiting the offices of a listed US corporation to discuss some of the latest in embedded imaging technologies. Again we find this unique contrast between old and new, the historic and the technological.

I first visited Romania in 1994, shortly after it had emerged from the shadow of Nicolae Ceausescu. At that time it was facing a huge challenge to develop a working economy and find some way to survive in the global marketplace. Romanians always despaired about their future but I always told them that they were going to go through the same transitions as most Western economies, but what took 30-40 years to happen elsewhere would take 10-15 in Romania. Now 15 years later on I see that is very much the case.

I finished my week back in Bucharest, meeting with the Vice Dean of Polytechnica University – the largest Engineering University in Romania. On the last evening before leaving I walked the streets of the old town with some Engineering colleagues and from the number of young Romanians in bars & cafes we could have been in Paris or London. Except, of course for the Architecture which has that solid and precise, yet in places, quite edgy and haphazard medievalism about it, echoing the unique character of its people.



The local Equivalent of the "Hollywood" Sign.



Beautiful Medieval Architecture of Brasov.



One of the large electricity dams of Voineasa.



And the beautiful lake above.



City-Center of Brasov – Very Peaceful.



Fly-over view of Brasov.

IEEE Consumer Electronics Magazine

Call for Papers – Launching Q1 2012

The IEEE Consumer Electronics Society will launch its flagship society magazine during the first quarter of 2012. The magazine will be published on a quarterly basis and will feature a range of topical content on state-of-art consumer electronics systems, services and devices and associated technologies.

Articles should be broadly scoped – typically review and tutorial articles are particularly suited to the Magazine. Technical articles may be suitable but these should be of general interest to an engineering audience and of broader scope than regular technical papers.

Some example fields of interest include:

Digital Broadcast & HDTV	Smart-Grid & CE	Displays for CE
Interactive & Immersive TV	Home Networks & Services	Storage & Digital Media
Smart Imaging & Cameras	Audio Systems & Technologies	CE & Digital Content Issues
Mobile Devices	Security & Rights Management	Device Interconnects
Digital Video Processing & Codecs	HCI & User Interface	Haptics & Multi-Touch
3D Imaging & Display	Wireless & RF in CE	CE Image & Signal Processing
Home Healthcare	New & Emerging Technologies	Gaming Devices & Systems
Social & Economic Impacts of CE	Wireless Sensor Networks in CE	CE & Cloud Computing

Articles related to the background story behind engineering standards or practical experiences in product specification and design are particularly welcome. Tutorials on CE related technologies or techniques are also encouraged.

The Magazine will also feature regular sections devoted to standards, patents & IP matters, security & digital content, device tear-downs and reviews of books and engineering software & design tools. If you are interested in contributing please contact the editor at cesmagazine@gmail.com for feedback and to discuss the suitability of your ideas for an article.

AN APPEAL TO PATENT AGNOSTICS

Conor Boyce,
Partner, FR Kelly

Do not go up, for the Lord is not among you, lest you be struck down before your enemies – Numbers 14:42

Conor Boyce M.Eng., C. Eng., European Patent Attorney, Community Trade Mark Attorney.



Conor graduated from University of Limerick in 1991 with a Masters degree in Electronic Engineering and qualified as a

European Patent Attorney with FRKelly in 1993.

From 1997 to 2000 he worked with IBM as a Senior Patent Attorney, and is a named inventor in his own right on an IBM Patent. He rejoined FRKelly in 2000, and joined the Partnership of the firm in 2006.

Conor is one of Ireland's leading authorities on patents for software-implemented inventions, and is one of the most experienced attorneys specializing in software, electronics and telecommunications inventions. From his time with IBM he gained a thorough knowledge of the commercial aspects of licensing and commercialization of IP.

Conor is a member of the Council of the European Patent Institute (epi) and sits on the Professional Qualifications Committee of the epi. He also acts as a tutor on the CEIPI course preparing students for the European Qualifying Examination.

Patents have been awarded for hundreds of years and whether by design or circumstance, the patent system has proved in that time to be the only one to successfully encourage inventors to disclose how their inventions work in exchange for the grant of a limited monopoly for their inventions. This largely self-regulating system has provided a balance of incentive and reward which in turn

has driven innovation in the free market and lead to many of the more significant technologies whose benefits we enjoy every day.

We know for example that many new drugs are only brought to market on the basis they are protected by patents, as otherwise companies would not incur the enormous costs of research and trialing the drug, knowing their competitors could then freely use the knowledge subsequently. On the other hand, while those of you reading this article in electronic form may appreciate that Tim Berners Lee gave the World Wide Web to the world free of patent rights, and indeed it is no surprise that an academic did so, many of the improvements that have been made to the Internet over the last 20 years or so have been subject to patents and without these our world would be a far less colorful, interesting and efficient place.

Nonetheless, it is probably fair to say that those outside the Intellectual Property Profession may have a poor understanding of the patent system. Indeed even many regular users of the system can struggle to grasp some of its principles.

When advising clients, IP practitioners face similar challenges to the clerics of the world's religions in guiding their client congregation. The cleric's job can be easier as he can fall back on the "faith" of his flock, whereas the IP Attorney sometimes finds that his clients need to acquire a qualification in theology before they can fully appreciate the subtleties of the IP creed.

In even the simplest of products, the Intellectual Property components can include Trademarks, Copyright, Patents, Designs without even considering Domain name rights, Semiconductor Topography rights, Database rights etc. For some products, trademark protection takes precedence – imagine the consequences

for Google or Coke if they no longer had exclusive rights to use their trademarks! For others, copyright comprises the core component of their business, for example, in a piece of music or indeed any multimedia material, software or literary work. Each of these forms of "intellectual property" have their own specialized practitioners, obscure rites, rituals, traditions and legal ceremonies.

For the purposes of this series of articles, we will limit our concerns to patents. Continuing with the religious analogy, there are those who believe in patents and those who do not. Indeed much as in our free society, individuals and companies are perfectly free to adopt whichever belief system they wish. For example, there are companies who will aggressively attempt to secure and enforce patents for any kind of invention, sometimes independently of whether or not they intend bringing a product incorporating that invention to market themselves.

Some readers will no doubt be familiar with US NPEs (non-practicing entities) and their previously favored form of transport, the submarine patent! Fortunately the patent system does evolve over time and the arcane practices that enabled yesterday's sub-mariners to build billion dollar corporations are no longer possible.

On the other hand, there are the non-believers who divide into the agnostic camp who simply ignore patents, and the more fanatical non-believers who actively attempt to limit and restrict the IP protection afforded to others.

One example of this particular line of evangelists are those in the software industry who for whatever reason, believe that copyright should not be afforded to authors of software and that patents should not

be awarded for software implemented inventions. This latter category may or may not have vested interests and I will not attempt to disabuse them of their views here; but for the agnostics, ignorance is no defense when they encounter a believer armed with and about to enforce patent rights against them.

Indeed, often the reason a non-believer is faced with such a threat is because the 3rd party has recognized that the non-believer does not hold any patent rights that might be deployed defensively and so they are perfectly free to assert

their own rights without fear of retribution.

As in many other areas in life, I can only recommend that before one “converts” to a particular patent belief system, it is essential to test the practical basis on which that belief system will be established, ideally taking advice from a qualified practitioner.

Equipped with the relevant knowledge, you can then take a more pragmatic view in relation to whether your business should be filing patent applications, for what aspects of your business, and in

which jurisdictions, weighing up the costs involved in doing so, the likely scope of patent which might be available and the relevance of that patent to your customers and your market. There may also be options to license or acquire 3rd party rights or to join industry patent pools. Then armed with this information, informed decisions can be made.

Any other approach is simply leaving to chance what could be one of the most important and valuable assets of your undertaking and with potentially catastrophic consequences.

CONFERENCE BRIEFING – ICCE-BERLIN 2011

<http://www.icce-berlin.org/>

Conference Overview

From 6th to 8th September the IEEE International Conference on Consumer Electronics ICCE-Berlin 2011 will take place. It will be held in close connection with the IFA “Consumer Electronics Unlimited”, the leading trade show for Consumer Electronics and Home Appliances, which takes place from the 2nd to 7th of September, overlapping slightly with our ICCE-Berlin Conference. The participants of the ICCE-Berlin will get a ticket to visit the IFA. Of course, the IEEE Consumer Electronics Society’s flagship ICCE conference is held annually in Las Vegas, but we are very happy to host a CE-Conference now the first time in Berlin. The time for the organization was short but we all tried to do our best to make it a success. And we also hope it will become an annual event.

Slowly the program approaches its final form. The conference will bring together researchers and engineers from industry, research centers, and academia. Like the other CE conferences it will provide a forum for the researchers, system

developers, and service providers to share their ideas, designs and experiences. Keynotes and extra events and will round up the program.

ICCE Berlin is co-located with IFA 2011.

Conference Highlights

We will have a series of keynote, the opening keynotes will be held by Karl-Heinz Brandenburg, director of the Fraunhofer Institute for Digital Media Technology IDMT and one of the inventors of the MP3 player. His keynote talk is titled: *The Future of Digital Media: Interactive and Immersive?*

A complimentary talk will follow by Ralf Schaefer on the topic of

3D-TV and UHD-TV – Perspectives of Consumer Electronics after HDTV.

A visit to Ralf Schaefer’s HDTV Labs in Berlin during the conference will be organized.

A session on Green Technology addresses an actual interesting topic. Niels F. Nissen will held a Keynote *The Push and Pull of Greening Electronics*, K. Schischke from Fraunhofer Institute IZM in Berlin organized two sessions on Green Technologies and Wayne Rifer will held a 2 hours workshop on *Environmental Standard Development for Consumer Electronics EPEAT – IEEE 1680 Family of Standards.*

Reinhard Moeller from Bergische Universitaet Wuppertal Germany and his group will present a new LV Game:

“Heavy Me[n]tal Pong”.

They want to implement a Multi-touch-capable version of Pong that can be played by two to six players. The MT Display must be mounted horizontally like a gaming table. It is planned to show it in Las Vegas ICCE too.

But we hope to present to the participants not only the latest developments of consumer electronics, but



Karlheinz
Brandenburg



Ralf Schaefer

provide also a glance into one of Europe's most vibrant cities. The GOLD members might extend the welcome reception on the first evening with a visit of an interesting place in the city. We will have a conference dinner at the Berlin Hotel Seehof, nearby the conference place, were traditionally well known artists stay. The terrace allows a nice view on a lake surrounded by green the middle of the city.

The ICCE-Berlin Team:

The local team in Berlin i.e. Hans Cycon, Thomas Schmidt, Matthias Wählich, and Horst Schwetlick work in close contact with Charlotte Kobert and Stefan Mozar. The Berlin team members know each other from common research projects at the HTW, University of Applied Sciences in Berlin. Thomas Schmidt was the former leader of the HTW computer center, Matthias Wählich a researcher in many of its projects. Hans Cycon and Horst Schwetlick worked as Professors at the department of at the department of Electrical Engineering.



Now **Thomas Schmidt**, the program chair of ICCE Berlin, is a well known scientist and Professor at the HAW Hamburg, University of Applied Sciences and since 2004 he is Professor of Computer Networks & Internet Technologies at HAW Hamburg, Department of Informatik. He is a regular Contributor to IETF/IRTF



Niels F. Nissen



Karsten Schischke



Wayne Rifer



Reinhard Moeller

Work. Also Thomas Schmidt has organized several Conferences.



Matthias Wählich, publications chair, started his professional activities at the the computer center of the FHTW Berlin while at high school and is the cofounder of link-lab, a start-up company in the field of next generation networking. His major fields of interest lie in efficient and reliable Internet communication. Matthias won several awards and has been on the TPC of several international conferences and workshops.

Hans L. Cycon, vice chair and treasurer of ICCE Berlin and chair of the German section of the CE society, is Associate Director of Daviko GmbH



Berlin, Germany and Professor emeritus from HTW Berlin, University of Applied Sciences Berlin. Research activities led him to the Courant Institute of Mathematical Sciences (NYU) New York; CALTEC in Pasadena; Old Dominion University in Virginia and ICSI at Berkeley University in California. Hans L. Cycon has been leading several projects in developing wavelet-based still image and video compression codecs. He is senior member of the IEEE and member of the German delegation on the ITU/ISO standardization committee for JPEG 2000 still image standard.



Horst Schwetlick, conference chair of ICCE Berlin, senior member of the IEEE, teaches since 1995 at the HTW-Berlin, University for Applied Sciences. His interest in Audio and Video technology lead him to study EE and acoustics at the Technical University Berlin and at Cornell University USA. He visited the Kyoto and Tokyo Institutes of Technology in Japan with a Humboldt and JSPS post doc fellowship, and spent sabbatical terms at research departments of Schlumberger Tx, USA, and Siemens, Munich, Germany. His research interests include particular signal processing and wireless communications in the scope of consumer electronics.



IFA 2011 – Get in touch

Product premieres and innovations from around the world

Berlin, 2–7 September 2011

The IFA is the host of the IEEE International Conference on Consumer Electronics ICCE-Berlin 2011. The conference takes place close to the ground of the IFA in the International Congress Center Berlin (ICC). All participants will get a ticket to visit the IFA during one of the first two conference days.

IFA in Berlin, the global trade show for consumer electronics and home appliances, presents the latest products and innovations in the heart of Europe's most important regional market. Only IFA offers such a comprehensive overview of the international market and attracts the attention of trade visitors each year from more than 100 countries. IFA is the main meeting place for key retailers, buyers, and experts from industry, trade and the media.

IFA is your personal chance to get the latest information first-hand. Don't miss the opportunity to explore emerging trends in the IFA iZone and IFA eLibrary and celebrate the premieres of new technologies and products. Get in touch – with IFA 2011 innovations.

IFA – International Keynotes

IFA International Keynotes provide a platform for top managers from the consumer electronics and home appliance sectors. This is where you can meet leading CEOs and visionaries and learn about trends, innovations, and global product developments. Turn knowledge into your competitive edge!

IFA – TecWatch

IFA TecWatch is the platform for innovation, the IFA future lab for technologies and applications in the consumer electronics and home appliance industries. This is where you can explore key global issues in the context of institutional and industrial research. Take a look behind the scenes and discover today the products and solutions of tomorrow.

IFA – DisplaySearch Business Conference

Join international TV industry experts, manufacturers, and suppliers as they discuss market analyses, trends, and future technologies. This is the place to acquire essential knowledge and cutting-edge expertise in the European and global display market. Get in touch – with knowledge and trends!

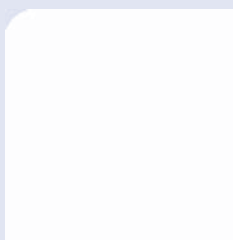
Venue

Berlin Exhibition Grounds
Messe Berlin GmbH,

Messedamm 22, 14055 Berlin, Germany

IFA Hotline: Tel. +49(0)30/30696924

www.ifa-berlin.com



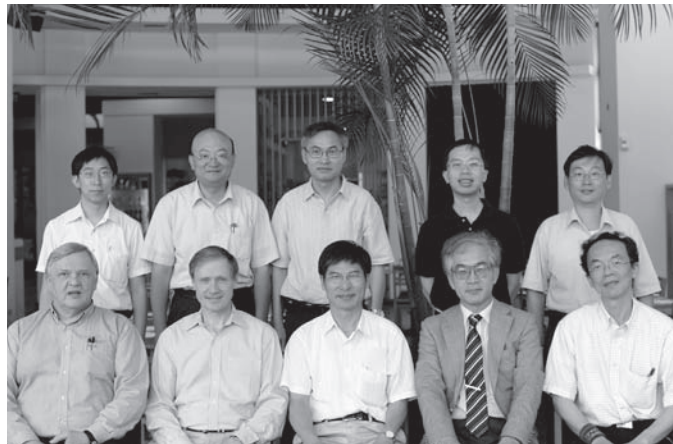
TEC WATCH



From the President *continued from page 3*



Meeting in Seoul, South Korea from left to right: **First row:** Gabsoo Han, Ph.D., Vice President, Samsung Seong Dae Kim, Ph.D., President of The Institute of Electronics Engineers of Korea (IEEK) Stefan Dukes Stefan Mozar **Second row:** Joonki Paik, Ph.D., Business Administration Manager of IEEK and Prof., Joongang University Kukjin Chun, Ph.D., President-Elect of IEEK and R10 Vice-Chair of Membership Activities Kim Taechan, Ph.D., Master Image, Samsung Byeungwoo Jeon, Ph.D., Prof., Sung Kyun Kwan University Young Shik Moon, Ph.D., VP of IEEK and Prof., Hanyang University Sung-Jea Ko, Ph.D., VP of IEEK and Prof., Korea University Chang-Su Kim, Ph.D., Chair of Seoul Section of IEEE and Prof., Korea University, Professor Hase.



Members of the National Taiwan University (NTU), National Taiwan Normal University and National Chung Hsing University: **First row:** Stefan Mozar Stephen Liang-Gee Chen, Ph.D. National Professorship, Deputy Dean, College of EECS, NTU Professor Hase, Ph.D. Yuh-Dauh Lyuu, Prof, Chairman & Deputy Dean, Dept of Computer Science & Info Eng, NTU **Second row:** Shao-Yi Chien, Associate Professor of EE department NTU Wen-Chung Kao, Prof & Chairman, National Taiwan Normal University Homer H.Chen Prof NTU Yen-Kuang Chen, Ph.D. Intel Yeong-Kang Lai, National Chung Hsing University.



Prize-giving ceremony for best paper at ISCE 2011; Stephen Dukes and Stefan Mozar from CE Society in attendance.



Thomas Coughlin, Gene Frantz and Stephen Dukes underneath the banner of the CECNet 2011 conference.



The meeting with the National Taiwan University in Taipei, Taiwan from left to right: **First row:** Prof. Hase, Ph.D. Stephen Dukes Liang-Gee Chen, Ph.D., Prof., Deputy Dean, College of EECS, National Taiwan University, Stefan Mozar **Second row:** Yen-Kuang Chen, Ph.D., Intel, Principal Engineer; Ming-Sui (Amy) Lee, Ph.D.; Assistant Professor NTU, Yeong-Kang Lai Ph.D.; Associate Prof., National Chung Hsing University; Wen-Chung Kao Ph.D. Professor & Chairman, National Chung Hsing University.



From left to right, the Industrial Technology Research Institute (ITRI): **First row:** Professor Hase, Ph.D. Stephen Dukes Gin-Kou Ma, Ph.D., CTO, IC Design Group, ITRI Tihao Chiang, Ph.D., Professor, National Chiao Tung University **Second row:** David Chang Vincent Hsu Jan Chiou.

India in 2010 and give a distinguished lecture and recognize the first CE Chapter in Bangalore, India.

In my last trip to Asia, Professor Hase, Vice President for International Strategy, Stefan Mozar, Vice President for Conferences, and myself met with IEEE CE Society members in Seoul, Korea, concern-

ing additional papers for Transactions and CE magazine, recruit Associate Editors, increase CE membership, GCCE 2012 TPC participation, ISCE 2012 attendance and papers, a future conference in Korea, participation in hallway activities and demonstrations at ICCE 2012 and ICCE Berlin 2012, keynote speakers and chapter growth.

We met with the IEEE Korea Society to discuss an IEEE sister agreement between the two societies and potential joint conferences, initially, with a technical co-sponsor arrangement. Future mutual agreements may include a CE conference in Korea. Samsung executives, including Gabsoo Han, Vice President and Kim Taechan, Master Image, and several Professors from Sung Kyun Kwan University, Hanyang University, Chung-Ang University and Korea University, Seoul National University, the IEEE CE Seoul Chapter participated in this meeting.

Later, we met with LG Research and Development executives, including Taeg il Cho, Vice President and Chief Technology Officer to review the criteria for a CE conference in Korea. This series of meetings in South Korea was successful.

After Seoul, Korea, we traveled to Taipei and Hsin-Chu, Taiwan to meet with IEEE CE General Chair and conference organizers of recently names ISCE 2013 to discuss the logistics of the conference to be held at the National Chiao Tung University in Hsin-Chu. The conference, speaker preparation area and break



The following were in attendance at the LG Electronics facility from left to right: Chang-Su Kim, Ph.D., Chair of Seoul Section of IEEE and Professor, Korea University Professor Sung-Jea Ko, Ph.D. Stefan Mozar Stephen Dukes, Taeg il Cho, Vice President / Director of Convergence R&D Laboratory / Corporate R&D / LG Electronics Inc., Professor Hase, Ph.D. Kyung Woo Hong, Senior Manager / Leader of Tech Alliance Group / Corporate R&D / LG Electronics Inc.

facilities will serve as an excellent facility for the ISCE 2013 Conference. I encourage you to mark your calendars and attend the ISCE 2013 Conference in Hsin-Chu, Taiwan.

In the meetings held in Taiwan, Stefan Mozar discussed the ISCE 2012 in Hersey, Pennsylvania and Dr. Hase provided an overview of the GCCE 2012 to be held in Tokyo. Stefan presented details on the upcoming ICCE Berlin 2012 Conference to be held in Berlin, Germany in September 6th–8th and ICCE 2012 to be held in Las Vegas, Nevada in January of 2012. While each of these conferences has a different venue or agenda, a universal theme exists to discuss and present new developments in the rapidly growing field of consumer electronics.

We, also, met with professors at National Taiwan University, National Chiao Tung University, National Chung Hsing University and Industrial Technology Research Institute (ITRI). During these meetings we discussed the conferences, need for authors, TPC reviewers and conference organizers. We also requested the need to review papers from conferences in China to aid the TPC with the large number of paper submissions.

ITRI works closely with academia and industry to create an incubator for new technology and applications for Taiwan. We toured the Taiwan Science Park where many of these research efforts are now exist. UMC and TSMC fabrication facilities are located. I must say the Taiwan Science Park is one of the most impressive

parks of its kind in the world, today.

In each of the meetings in South Korea and Taiwan, we formally presented the IEEE CE Society. A copy of this presentation can be requested from myself at stephendukes@ieee.org or Charlotte Kobert, Executive Assistant for the IEEE CE Society, at ckobert@ieee.org.

We anticipate the GCCE 2012 will be extremely successful with more than 750 papers expected. I mentioned in the CE Newsletter in Spring 2011 issue, that Dr. Tomohiro Hase, Vice President, International Strategy, and I had meet with three technical societies in Japan. On October 6th, Professor Hase, Stefan Mozar and I will participate in the CEATEC press conference to introduce Global Conference on Consumer Electronics (GCCE) 2012 to be held in Tokyo October of next year.

The ICCE 2011 held in Las Vegas was our most successful conference, to date. The International Conference on Consumer Electronics is held annually adjacent to the International CES show in Las Vegas, Nevada. We continue to align the conference to closely associate with the CES and provide a technical venue for those involved with the show, along with those actively attending the Show. The ICCE venue continues expand with hallway sessions and adjacent efforts with other societies. We encourage you to attend the ICCE 2012 in Las Vegas.

The IEEE CE Society is promoting the growth of conferences in regions responsible for development of consumer electronic products, such as, Asia and Europe. With our new conferences we will be able to provide more local events for our members. This includes not only academic activities, but also presentations, tutorials and workshops that relate to the applied side of consumer electronics. The CE Society now

includes, not only, a five to six page peer review technical paper, but a two page non-peer reviewed paper and a peer reviewed PowerPoint presentations. The peer reviewed conference papers and PowerPoint presentations are published in the IEEE Xplore. The conferences are an

important part of stabilizing and growing the CE Society in each region of the world.

I request you give consideration to submitting a peer reviewed technical paper to the IEEE Transactions on Consumer Electronics or the CE Magazine, a technical paper or a Power-

Point presentation to a conference, a hallway presentation at one of our conferences, joining a CE Chapter, becoming involved with one of the CE Society Committees or considering election to the CE Administrative Committee (AdCom). We welcome your comments and participation.

CONFERENCE FOCUS - IGIC 2011

Special Panels, Speakers and Exploration Tours
Tom Coughlin, Publicity Chairman,
and Newton Lee, Exploration Chairman



The 2011 IEEE International Games Innovation Conference is November 2-4, 2011 at Chapman University in Orange, California.

This 3 day event is sponsored and organized by the IEEE Consumer Electronics Society and we are accepting industrial presentations beyond the deadlines of academic paper submissions. This will be the third of these conferences and this year's event will be bigger than any of the prior conferences. More information about the industry submission is available from the conference web page at: <http://ice-gic.ieee.cesoc.org>.

In addition to several sessions with regular industry and academic presentations there will be keynote speeches by Trip Hawkins, Founder of Electronic Arts, 3DO and Digital Chocolate; Robert J. Mical, formerly with Sony, Craig Hampel from Rambus and Ohad Shvueli from PrimeSense (inventors of the Kinect technology).

Also there are several newly committed panels on important topics for modern games. There is an international panel on "Playing with Reality, Alternative Reality Games, Urban and Serious Play" that is led by Patricia Gouveia from Universidade Lusofona de Humanidades e Tecnologias, Portugal, which will include Darren O'Donnell from the Tendency Group, Canada, Jeff Wat-



A tour of Team-Disney Building will be one of the exploration activities at IGIC2011

son from the University of Southern California, USA, Michael Liebe from Mediaboard Berlin-Brandenburg GmbH, Germany, and Flavio Escibano from ARSGAMES, Spain.

There are additional panels organized by Jim Parker from the University of Calgary on "University Curriculum Development Feeding the Games Industry," and a panel on digital storage in games, "No Storage—No Games" organized by Tom Coughlin of Coughlin Associates. A tutorial by Adrian David Cheok of the National University of Singapore and Keio University will discuss "Culture, Learning and Play in Our Radically Connected Era."

Newton Lee, co-author of *Disney Stories: Getting to Digital* (2011), is the Exploration Chairman of IGIC 2011, fostering out-of-box thinking,



out-of-Conference scheduling. He is the organizer of a tour to the Disney Research Lab in Glendale on November 1, 2011 (afternoon before the Conference) and a

tour to the Disney Worldwide Headquarters in Burbank on November 4, 2011 (immediately after the Technical Program.) The Glendale facility tour will focus on latest Disney research projects whereas the Burbank facility tour will focus on the history of Disney. Space is limited to the first 20 registered.

Those wishing to attend should check the web site for registration, <http://ice-gic.ieee.cesoc.org/2011/registration.htm>. More details can be obtained by contacting Charlotte Kobert at ckobert@ieee.org.



International Games Innovation Conference November 2-4, 2011

Chapman University – City of Orange, California 92866 USA (Near Disneyland and Newport Beach)

Keynote Speakers

Conference Opening



Trip Hawkins
*Founder, Electronic Arts,
3DO and Digital Chocolate*

Reception Banquet



Robert J. Mical
SONY

Award Luncheon



Craig Hampel
Rambus

Conference Closing



Ohad Shvueli
PrimeSense

Committed Panel: Playing with Reality, Alternate Reality Games, Urban and Serious Play



Leader:

Patrícia Gouveia
Universidade Lusófona de Humanidades e Tecnologias
Lisbon, Portugal

Panelists:

Darren O'Donnell
The Tendency Group, Toronto, Canada

Jeff Watson
University Southern California, Los Angeles, CA USA

Michael Liebe
Mediaboard Berlin- Brandenburg GmbH, Berlin, Germany

Flavio Escribano
ARSGAMES, Madrid-Seville, Spain

For more information, go to <http://ice-gic.ieee-cesoc.org>, or
contact conference coordinator, Charlotte Kobert ckobert@ieee.org





International Games Innovation Conference November 2-4, 2011

More Committed Talks:

Rambus



Sponsored by
IEEE
Consumer Electronics Society



Technically Co-Sponsored by



Tutorial Speaker:

Adrian David Cheok

**National University of Singapore
& Keio University**

Tutorial Topic:

**Culture, Learning, Play in Our Radically
Connected Era**



Panel Leader:

Tom Coughlin

Coughlin Associates

Panel Topic:

No Storage – No Games:

The Role of Memory and Storage

Architectures in Game Design Performance



Panel Leader:

Jim Parker

University of Calgary

Panel Topic:

University Curriculum Development

Feeding the Games Industry

A REVIEW OF POPULAR GAMES CONFERENCES

The advancement in Games Technology, Applications and Media Delivery has been drawing mainstream publicity in recent years. The IEEE Consumer Electronics Society's involvement in this field has expanded in the last 3 years with the sponsorship and organization of the Games Innovation Conferences. As we put together the program for the 3rd International Games Innovation Conference in Orange, CA on November 2-4, 2011, it behooves us to know the landscape, engage in state-of-the-art discussion, and recognize the trends of Games Technology evolution, specifically for CE professionals' growth.

We summarize the latest status of five Conferences, in the field of games, where we have had first-hand exposure in terms of location, publicity, participation, and/or direct involvement in technical paper reviews.

- 1) Los Angeles Games Conference, April 26, 2011. Orientation: Games Marketing (5th year, \$699 on-site registration, attendance: ~ 300) Sponsor: Digital Media Wire.
- 2) Game Developers Conference, February 28-March 4, 2011, San Francisco. Orientation: Games Development (25th year, \$2,100 on-site registration, attendance ~ 19,000) Sponsor: United Business Media.
- 3) Electronic Entertainment Expo – E3, Los Angeles, June 7-9, 2011. Orientation: Games Product Promotion (200th Show, multiple shows/locations each year, \$500 full registration, attendance: ~ 47,000) Sponsor: Entertainment Software Association.
- 4) Westwood Games Conference, "The Gathering of Video Legends," Anaheim, California, June 25, 2011. Orientation: Education (3rd year, free, attendance: ~ 400) Sponsor: Westwood College.
- 5) Advancements in Computer Entertainment Technology (ACE)



Narisa Chu –
Executive
Chairwoman



Michael Fahy –
Local Arrangement
Chairman

Lisbon, Portugal, November 8-11, 2011. (8th year. €900 on-site registration) Sponsor: the Association for Computing Machinery (ACM)

Highlights for these events are provided below:

- LA Games Conference (<http://www.lagamesconference.com/>)

The 5th LA Games Conference, sponsored by the Digital Media Wire (DMW) was well organized and attended with more than 300 people and a versatile group of speakers on marketing and business development of games into the digital age. Debates and product announcement took place in lively settings covering media, entertainment and technology. Realizing that the Game industry was gathering tremendous momentum, this film based audience got into Games discussion in a dynamic way. The conference included debates about Facebook as a Gaming Platform as opposed to dedicated platforms such as Microsoft's X-Box. More than 60 speakers shared their views on a single day across topics including:

- 1) Gaming Trends around the World by Analysts
- 2) Gaming in the Cloud
- 3) Selling Games in 2011 and Beyond
- 4) The Smartphone and Tablet Revolution
- 5) How to Succeed in Selling Virtual Goods for Games and Social Networks
- 6) Viral Gaming

- 7) Advertisers to Connect with Millennials
- 8) The Future of Gaming: 3D?
- 9) Gaming, Film and Television

- Games Developers Conference – GDC (http://www.gamasutra.com/php-bin/news_index.php?story=33379)

The Game Developers Conference is vast and popular and it addresses the art and science of making games. GDC 2011 hosted a record 19,000 game industry professionals at San Francisco's Moscone Convention Center for the 25th edition of this conference. GDC offered ~ 450 lectures, panels, summits, tutorials and round table discussions. Lecture highlights include ~ 15 tutorials and summits: notable among them: Rovio's Peter Vesterbacka discussing the *Angry Birds* phenomenon (GDC Smartphone Summit), Zynga's Mark Skaggs on going from *FarmVille* to *CityVille* (Social & Online Games Summit), game designer and author Jane McGonigal on 'gamefulness' (Serious Games Summit), and *Super Meat Boy's* creators on their rough route to success (Independent Games Summit). This is one of the oldest and most popular conferences for Games professionals.

- Electronic Entertainment Expo – E3 (<http://www.e3expo.com/press-release/post/341/e3-2011-propels-video-games-to-center-stage/>)

Nearly 47,000 video game industry professionals, investor analysts, and 120 retailers attended the Electronic Entertainment Expo – E3, 2011, run by the Entertainment Software Association (ESA.) E3 projects a global computer and video game trade show with ~ 200 exhibitors unveiling their latest interactive entertainment hardware and software that are targeted for store shelves by the end of 2011.

E3 is a product show case. It is dedicated to serving the business and public affairs needs of the companies publishing interactive games for video

Table 1-A Survey of Popular Games Conferences in 2011.

Name	Dates	Location	Orientation	Years	Registration On-site	Participants	Sponsor
IGIC	11/1-11/4	Orange, CA, USA	R & D Academia & Industry	3	\$700	N/A	IEEE CE
ACE	11/7-11/11	Lisbon, Portugal	R & D	8	900€	N/A	ACM
E3	6/7-6/9	Los Angeles, CA, USA	Product Promotion	200th*	\$500	47,000	ESA
Westwood	6/5	Anaheim CA, USA	Education	3	-	400	Westwood College
LA Games	4/26	Los Angeles, CA, USA	Marketing	5	\$699	300	DMW
GDC	2/28-3/4	San Francisco, CA, USA	Development	25	\$2,100	19,000	UBM

*Multiple locations per year

game consoles, handheld devices, personal computers, and the Internet.

Said Michael D. Gallagher, President and CEO of the ESA: E3...“to have propelled video games to the pinnacle of the entertainment world with combination of industry’s innovation, creativity, and excitement. The latest E3 has shown that video games are proven a dominant force in entertainment and are changing the way people live, work, and play.”

- Westwood College Games Conference – The Gathering of Video Legends (<http://gamepolitics.com/2011/06/24/westwood-college-hosting-gathering-video-game-legends-june-25>)

Third in its annual conference, this one-day event provided attendees (many of them, Westwood College students majoring in Game Art or Game Software Development) with an opportunity to interact one-on-one with leading professionals in the industry. Speakers discussed several aspects of the gaming industry including:

- The influence of technology on big budget games
- The secret to making casual games successful
- The future of mobile gaming

There was an impressive lineup of Games Legends including those from Sony Computer Entertainment, Armor Games, Realities Unlimited,

Blizzard Entertainment, Infinite Monkey Factory, Gaikai, Say Design, Video Games Live, and Way Forward. Career advice was offered to attendees interested in entering the gaming industry.

- ACE – Advances in Computer Entertainment Technology (<http://www.ace2011.org/>)

As it reaches the 8th edition, ACE has become one of the leading scientific forums for dissemination of cutting-edge research results in the area of entertainment computing recognizing that interactive entertainment is one of the most vibrant areas of interest and is among the fastest growing industries. Similar to IGIC, ACE 2011 is working on bringing together leading researchers and practitioners from academia and industry to present their innovative work and discuss all aspects and challenges of interactive entertainment technology, in a cool and stimulating environment. Similar to IGIC, ACE is by nature a multi-disciplinary conference whose attendance goes across a wide spectrum of interests and disciplines including computer science, design, arts, sociology, anthropology, psychology, and marketing.

Similar to IGIC, ACE has just completed a successful paper review

from their Call for Papers of nearly 160 submissions.

What differentiate the IGIC2011 from ACE are:

- 1) IGIC covers not only software, but hardware, system, and specifically wireless networking that facilitates the latest games interface among game consoles, TV and handsets.
- 2) IGIC provides follow-up high-quality publication opportunity in IEEE Consumer Electronic Transaction.
- 3) IGIC focuses on industry and academic research knowledge transfer engaging industry patron to work hand-in-hand with university faculties.
- 4) IGIC Calls for Slide Presentations – most accommodating to industry participants.
- 5) IGIC takes place near Hollywood (the world capital of films) and Disneyland (the first amusement park.)
- 6) IGIC and ACE do not seem to have overlapping audience so far. There are attempts to work together on future peer-reviewed publications.

These conferences, summarized in Table 1, all considered relevant to IGIC, provide in-depth guidelines and insights into Games research, development and industrialization. The IGIC 2011 has taken advantage of experiences and observations from these conferences to aid in

achieving CE Societies strategic directions in driving Games technology, aligning education and industry innovations to integrate computers, communications, wireless technol-

ogy, usability, arts and social sciences for advancements in Games. Thus, IGIC2011 programs will be exciting, some of which are displayed in 2 announcements, as

shown in the preceding pages, highlighting work by the Organizing Committee in reaching these goals.

For updates of IGIC2011, please access <http://ice-gic.ieee-cesoc.org>

DOWN MEMORY LANE



Editor's Introduction

Hi CE Society members. One mission that I have been given as editor is to make society members more aware of the Senior

Volunteers who keep your society operating and developing as a dynamic IEEE society.

In many ways your society is like a business, operating with the support and mandate of the core IEEE organization. In the context of this business analogy YOU, the society members, are the customers and this society it targeted to meet your needs as an engineering professional. But it is more than a business, it is also a professional community and it is not enough for the society to serve your needs, you need to become involved with and participate in the operational and decision-making processes of your society.

As with any business or community organization we have a board of directors, better known as the Adcom or "Administrative Committee" of the society. These are your elected representatives and have a mandate to operate and develop the CE

Society to meet your present and future needs.

Now many of you will have voted in the Adcom elections, but not everyone. And, of those who voted not all are fully aware of the mandate and responsibility you have conferred onto your fellow members. In many ways the responsibility of being a member of the Adcom is equivalent to membership of a commercial board of directors; in some ways it is even more challenging as the Adcom members have the additional responsibility of professional leadership within this professional community. It is not simply a mandate to run the business effectively and responsibly; it is also a mandate from your profession and peers. Each Adcom member has some personal responsibility that extends beyond his or her society and IEEE itself and is, in actuality, a challenge to represent their profession to society as a whole.

This is not a light responsibility to take on, and it is important that you, as a society member, know a bit more about those who represent you and your profession. Beginning with this issue of the Newsletter I'll be focusing on a different member of the CE Society Adcom each issue, giving you more

background information and some personal insight into those who you have chosen to represent your profession through IEEE.

This issue I am very happy to introduce Robin Bradbeer who is our Vice President (International Affairs) who liaises with the Society chapters around the world as well as working with members to establish new chapters. She also helps promote the Society's Distinguished Lecturer program.

Robin has been a Professor in Hong Kong University since the late 1980's. Prior to this she was involved in the very early days of the microcomputer revolution. Here we provide Robin's short biography followed by a series of two articles that she wrote for Practical Computing back in 1979. This was in the very early days of the micro-computer revolution – before IBM finally got their act together and launched the IBM PC.

Hopefully this insight into Robin and her broadly-ranging career in the micro-computer & consumer electronics industries will inspire some of our early and mid-career members to consider volunteering for more active roles and participation in the IEEE CE Society.

MEET DR. ROBIN SARAH BRADBEER

"Dr. Bradbeer's contributions to the continued development and revitalization of Chapters has been a critical part of grow-



ing the CE Society, globally. In addition to her professionalism on the CE AdCom. Robin has also been active in supporting

Dr Robin Bradbeer graduated from Surrey University, UK with a BSc(Hons) in Electrical Engineering in 1967, and an MPhil in Semiconductor Electronics in 1973. She obtained her doctorate at Durham University, UK in 2006 with a

thesis on evaluating the effectiveness of web-based teaching and learning.

Dr Bradbeer has had extensive involvement with computer-based education since the late 1970s. She first used a computer as part of undergraduate course in 1964, built her first computer with students in 1973, and designed her first course

around computer-based learning principles in 1976.

the CE Society's efforts with IEEE MGA." - Stephen Dukes, President, IEEE CE Society

Dr Bradbeer has an extensive background in the computer and communications industry, from editing Educational Computing (UK) in the early 1980s, when she also wrote many articles for the serious press (Times, Guardian etc) and broadcast media in the UK on computers and

education, a number of books designed for schools and teachers, as well as helping to produce numerous video/TV programs for use in promoting IT in schools. She organized the first two Educational Computing Conferences in UK in 1982–3.

During this period she also worked as a consultant to many international computer companies, including HP, Sinclair, Commodore and Acorn. She established IGR Ltd in 1983 to design and build “turtles” for use in primary schools using LOGO; worked with Seymour Papert in developing LOGO as a teaching language. She was also Personal Adviser to the Director of UK National Computer Centre 1980–1986, specifically in the area of educational computing, and was a member of the Consultative Group developing an educationally based computer system to complement the BBC’s Computer Program (The BBC computer – later adopted as the basic system for use in most UK schools). She co-authored the book complementing the BBC TV program – The Computer Book – that became the basic introductory text in UK schools. Over 400,000 copies sold in the UK, with 10 foreign language editions. #1 best-seller in Sunday

Times Non-fiction list for 3 months in 1981.

Robin has been involved with networked computing since the mid 80s and started one of the first web based courses at CityU in the early 90s. She has been a believer in Internet-based education for nearly twenty years, and has promoted research into the effectiveness as a tool for education. She has been a director of a number of companies over the past 30 years, mainly technology based, both in UK and Hong Kong.

She first started working in Hong Kong in the mid 80s when she ran her own technical consultancy there. Currently she is Deputy Chair of the Board of Directors of the Hong Kong Internet Registration Corporation – the registry for the .hk domain.

Whilst at CityU Robin taught Electronics for Mechatronic Product Design on the Mechatronic Engineering degree course; her research and development work focused on remote sensing, mainly in the marine environment, including underwater robotics, using low cost consumer electronics components.

Robin has been active in the IEEE for over 20 years, being founding chair of both the Consumer Electronics Society Chapter and Robotics and



Automation/Control Systems Societies Joint Chapter in Hong Kong. She was also one of the founders of the International Symposium on Consumer Electronics (ISCE) being conference Chair twice, as well as local organizing Chair for the 2010 Games Innovation Conference. Robin has published over 20 books, and over 60 conference and journal papers. She is currently Chair of the IET Hong Kong Branch. She retired from City University as an Associate Professor in June 2010, and is an Adjunct Professor at the University of Southern Queensland, Australia. She started, and is now organizer, of the Hong Kong Underwater Robot Challenge, the regional contest of the MATE International ROV Competition.

THE NON-KIT COMPUTER

PRACTICAL COMPUTING April 1979

ROBIN BRADBEER spent a few hours with Steve Wozniak, inventor of Apple computers, some weeks ago. Today, Apple is one of the success stories of the microcomputer business. It is rich and independent, and its problems are those of over-demand, a rather pleasant position for a company.

Two years ago Apple was two guys and an idea in a garage. If you want to tune-in to commercial success in the home computer world, read on.

The Interview is in two parts. We begin with Steve’s story about the birth of Apple. In the next part the



questions are about ideas, developments, trends and opinions.

Long before Apple began. I was working at Hewlett-Packard, designing calculators. Round about that time in 1974, I became interested in video games. Atari and other companies were beginning to put their video games into coffee bars, bars, restaurants and similar places. So I thought I’d try to design my own version of them – I was one of those guys who was always playing around with these things as my hobby. This led on to a couple of other projects, chess displays and things like that.

That naturally led to the video terminal. There’s not much more to

Apple Introduces the First Low Cost Microcomputer System with a Video Terminal and 8K Bytes of RAM on a Single PC Card.

The Apple Computer. A truly complete microcomputer system on a single PC board. Based on the MOS Technology 6502 microprocessor, the Apple also has a built-in video terminal and sockets for 8K bytes of on-board RAM memory. With the addition of a keyboard and video monitor, you'll have an extremely powerful computer system that can be used for anything from developing programs to playing games or running BASIC.

Combining the computer, video terminal and dynamic memory on a single board has resulted in a large reduction in chip count, which means more reliability and lowered cost. Since the Apple comes fully assembled, tested & burned-in and has a complete power supply on-board, initial set-up is essentially "hassle free" and you can be running within minutes. At \$666.66 (including 4K bytes RAM!) it opens many new possibilities for users and systems manufacturers.

You Don't Need an Expensive Teletype.

Using the built-in video terminal and keyboard interface, you

avoid all the expense, noise and maintenance associated with a teletype. And the Apple video terminal is six times faster than a teletype, which means more throughput and less waiting. The Apple connects directly to a video monitor (or home TV with an inexpensive RF modulator) and displays 960 easy to read characters in 24 rows of 40 characters per line with automatic scrolling. The video display section contains its own 1K bytes of memory, so all the RAM memory is available for user programs. And the Keyboard Interface lets you use almost any ASCII-encoded keyboard.

The Apple Computer makes it possible for many people with limited budgets to step up to a video terminal as an I/O device for their computer.

No More Switches, No More Lights.

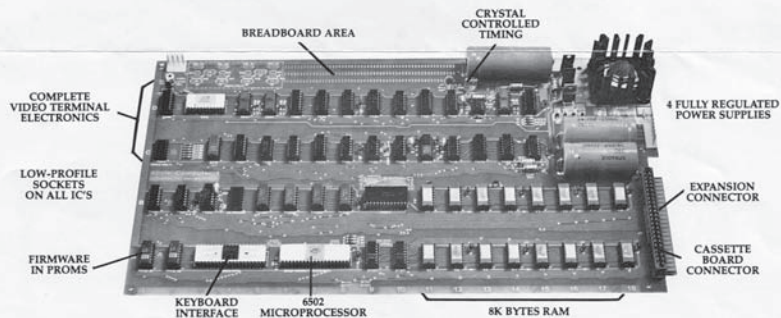
Compared to switches and LED's, a video terminal can display vast amounts of information simultaneously. The Apple video terminal can display the contents of 192 memory locations at once on the screen. And the firmware in PROMS enables you to enter,

display and debug programs (all in hex) from the keyboard, rendering a front panel unnecessary. The firmware also allows your programs to print characters on the display, and since you'll be looking at letters and numbers instead of just LED's, the door is open to all kinds of alphanumeric software (i.e., Games and BASIC).

8K Bytes RAM in 16 Chips!

The Apple Computer uses the new 16-pin 4K dynamic memory chips. They are faster and take ¼ the space and power of even the low power 2102's (the memory chip that everyone else uses). That means 8K bytes in sixteen chips. It also means no more 28 amp power supplies.

The system is fully expandable to 65K via an edge connector which carries both the address and data busses, power supplies and all timing signals. All dynamic memory refreshing for both on and off-board memory is done automatically. Also, the Apple Computer can be upgraded to use the 16K chips when they become available. That's 32K bytes on-board RAM in 16 IC's — the equivalent of 256 2102's!



Apple Computer Company • 770 Welch Rd., Palo Alto, CA 94304 • (415) 326-4248

Figure 1: Early advertisement for the Apple I micro-computer.

learn to build one of those after you've built a chess display. I looked through the data books and found the appropriate shift registers. My trademark is designing small, tight circuits – this helps to solve many problems later on – by keeping all the logic very close together. I was able to design and build a very simple video terminal.

Terminal Start

Of course, all this was taking place while I was still with HP – and none of it was for HP. About that time, the Altair computer had just been intro-

duced. My video terminal was almost finished and a friend mentioned that some people locally were about to start a club for those interested.

Microprocessors I didn't know the first thing about; video terminals I did. So I became one of the founders of a club which consisted initially of 40 people sitting in a garage with the rain pouring outside.

Working on Chips

We were sitting discussing microprocessors – which micro had this feature and which had that. Honestly, I

just didn't know what was going on – I'd never been into this hobby world at all; what I was doing was working on calculator chips which were a totally different style of microprocessor. I felt a trifle out of it, but I attended a few meetings and began to get to know what was going on.

Then I heard that Chuck Peddle (MOS Technologies) was to sell micros over the counter for around \$20 at an electronics trade fair. In the HP lab there were two of us really interested in this type of thing and we went there to buy ourselves some microprocessors.

Now the only micro with which I'd really had any experience up to that time was the 6800. In fact, I had designed on paper a complete system based around the 6800, but Chuck was selling the 6502.

When we went through the instruction set, found out everything it had and everything it didn't have, we were left with a question – what do you do with a computer?

I realised that Basic was the language which was becoming more and more popular, so I tried to write a Basic compiler with a few things of my own. A friend wrote an Algol program which ran on a HP2000 mini and simulated the 6502 chip, so I was able to write the guts of the Basic compiler. It eventually became our Integer Basic.

Making it Work

The next step was to design a system. There was this video terminal on my desk, so I put the microprocessor on it with enough circuitry to make it work as a system. I interfaced it to some RAMs, put a ROM monitor on it and powered up the thing. It started to interact with the keyboard and I could get it to go to various memory locations; it was a very basic first-level system.

There were still a couple of bugs; for example, I forgot to clear the decimal mode on the 6502 which everyone does when they first run it. I

took my compiler which was working on the simulator and loaded it in and that sat in the RAM.

Now that I had my system I had to do some more software. So I had to work out more and more of the Basic. While this was going on every few weeks the club would meet and I'd go down to show off the latest.

I got good at typing-in hex; I had no development aids, no cassette recorder, no floppy disc, no assemblers, so it was all done on paper and hand-coded.

I was pass 1, I was pass 2, I was the linking loader, I was the text editor, I was everything: I became very good at working out the op-codes in my head and putting it all down on paper.

At about that time I contracted asthma or something. This rather helped me to develop things because I couldn't sleep: I would get up in the middle of the night and work.

The friend I mentioned before had built his own system as well. My idea was the single-card system. He went for the more traditional route most people were taking which was slot-based and bus-structured—the CPU was just one of the cards, the memory was another.

I was still making hand-wired bread-boards. Then this friend of mine, Steve Jobs, said why don't we make a few boards like this and sell them? Our original idea was to build about 50 blank boards, take them to the club, hold them up in the air and say "Is anybody interested in buying one of these boards?"

First Big Order

I sold my HP calculator and Steve sold his van and we used the money to hire a printed circuit artist to layout the boards. While we were thinking about making the first boards, Steve received a telephone call to place a \$25,000 order for 50 complete computers, fully built. We were planning to sell only blank boards but these were orders for



Just two kids, some circuit boards and a garage....

boards which were fully-stocked with the chips.

The order was from the local Byte Shop. By arranging credit properly we were able to get all the components we needed to build the boards. Then we went and sold them on the date for which the purchase order was made out and were able to pay our creditors. It was a very neat operation. We were able to turn the whole thing around very fast, in less than a month. That put us in business – in a garage.

We decided to call the company Apple. Steve was working at a place called Apple Orchard, or something like that, in Oregon. It's a really great name – it's one of those names which sticks.

We used the garage for a year and we didn't move too many computers, about 200; but it was the name which sold, and we started advertising in the national magazines.

Fast Development

Of course, all this is on the side, and I'm still working at HP. I got a formal legal release from HP to allow me to do this sort of thing.

Stores were springing-up all over the country and the Apple was a different product from the others around. It wasn't a completely finished product like the Apple 2 – it was just a board with a microprocessor, 8k of memory and a video terminal.

I think we were the first people to use the 4K dynamic RAMs which were coming in at the time, so the Apple I used a lot less power and cost much less. With Apple I beginning to make an impression, we needed a cassette interface. That was our second product; it was a really fast development. We couldn't do it so fast now – it took about a month.

March 1976 was when we formed the partnership and started selling the computers. In June, I started on the Apple II which was designed to do all the things Apple I could do, but better. I was also very interested in color video.

It proved almost impossible to design a simple color circuit for the Apple I, so I decided to start completely with a new system and in fact everything turned out cleaner. The whole thing was still built as a single stand-alone system.

I had designed a game for Atari called Breakout, so I wrote another version of it with graphics commands. About a day to write and a day to debug and two weeks of modifying. I couldn't believe how easy it was to write in Basic compared to assembly language.

We took this to Atlantic City in September for our first Computer Fair, PC 76.

'Beautiful'

We came across this Advent projector television and thought it would be really neat if we could try the Apple II on the color projector TV to see what it would look like. We hooked the Apple II to this projector and threw it up on the screen and it looked just beautiful.

The guy in the booth said "I want one of those". Remember it was still a hand-wired breadboard at that stage. That told us something. Surrounded by all the fantastic video and computer equipment, this guy wanted ours.

Things were going really well. We were coming up with high-resolution graphics and the 16K RAM was coming along. In fact we started using 16K RAMs on the Apple I. I think we might have been the first people to sell 16K RAMs for a computer as an extension to the Apple I.

More Natural

The Apple II was probably the first small computer to use 16K RAMs as well. We feel we've kept up with the RAM technology all the way

through, and as we were one of the few to use this technology, it worked out to be very cost-effective in the end.

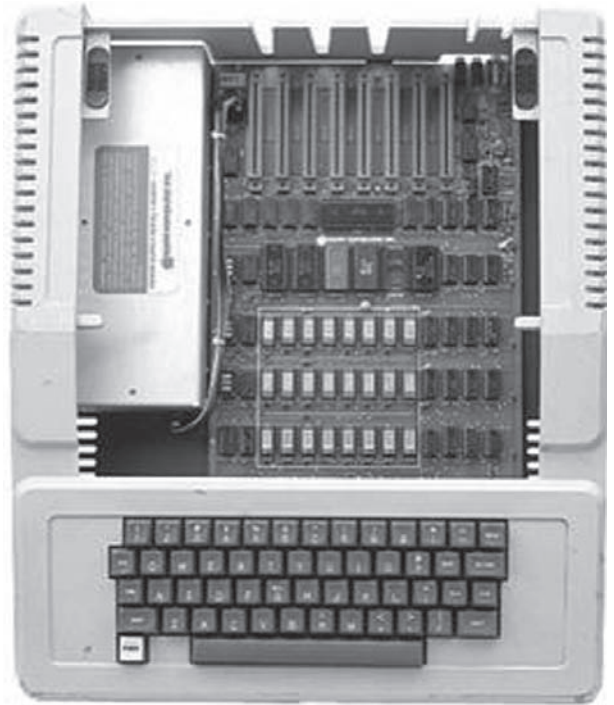
The final board design for the Apple II was done around November, 1976. It appeared eventually as a product about April, 1977. We didn't have a case designed.

Carl Helmers of Byte magazine got interested at this time. He was keen on having a small computer you could take home and plug in, rather like a piece of hi-fi equipment.

Straight Lines

We took the hand-drawn work and digitized it into the computer. The lines came out perfectly straight and the board looks better because the lines are all straight.

Meanwhile, the garage was filling with racks and test equipment and there was no way that we were going to be able to do the Apple II in there. There just weren't enough of us involved. We might have gone under; we could just not have met the demand.



A semi-clothed Apple-II; note the neat PCB design reflecting Wozniak's tidy design expertise.

News of the product had started getting out. For example, I was going to Los Angeles to demonstrate the Apple I to a group there and I forgot the transformers or something like that. All I had with me was an Apple II which I could demonstrate. So I showed that. It was still in breadboard form but there were about a dozen people at that meeting and eight of them ordered Apple IIs.



Apple-II in its plastic case - a first for the industry at that time!

GIVE YOUR APPLE VISION FOR CHRISTMAS!

The DS-65 Digisector® opens up a whole new world for your Apple II. Your computer can now be a part of the action, taking pictures to amuse your friends, watching your house while you're away, taking computer portraits... the applications abound! The DS-65 is a random access video digitizer. It converts a TV camera's output into digital information that your computer can process. The DS-65 features:

- High resolution: 256 X 256 picture element scan
- Precision: 64 levels of gray scale
- Versatility: Accepts either interlaced (NTSC) or industrial video input
- Economy: A professional tool priced for the hobbyist

The DS-65 is an intelligent peripheral card with on-board software in 2708 EPROM. Check these software features:

- Full screen scans directly to Apple Hi-Res screen
- Easy random access digitizing by Basic programs
- Line-scan digitizing for reading charts or tracking objects
- Utility functions for clearing and copying the Hi-Res screen

Let your Apple see the world!

DS-65 Price: \$349.95
Advanced Video F501 Camera Price: \$299.00
SPECIAL COMBINATION PRICE: \$599.00

THE MICRO WORKS

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 ship, but if you live in an area where we don't ship, a charge
 www.stefancomputing.com

Early computer vision for the Apple-II.

What every educator should know about desk-top computers.

It's easy to get into classroom computing. What's tough is to do it right. With so much talk about computers in the classroom, educators like yourself want all the facts before they recommend any system for classroom use. That's why Apple Computer's new "Curriculum Materials Kit" can help, with answers to your questions and some very important data you may not have considered before.

Who uses desk-top computers.
 Hundreds of innovative educators have already discovered the Apple Computer for instructional applications from kindergarten through college. Apple gives you computer-assisted instruction capabilities, including drill and practice, tutorial, problem-solving, games, simulations, and more.

Apple engages student interest with sound and color video. In fact, your students will be able to write programs and create high-resolution graphics. And you can use your Apple for testing, counseling, even classroom data processing. That's just the beginning.

What to look for.
 Once you've unlocked the power of the

desk-top computer, you'll be using Apple in ways you never dreamed of. That's when the capabilities of the computer you recommend will really count. You don't want to be limited by the availability of pre-programmed cartridges. You'll want a computer, like Apple, that you can also program yourself. You don't want to settle for a black and white display that limits you to just putting words and numbers onto the screen. You'll want a computer, like Apple, that can turn any color tv into a dazzling array of color graphics! The more you and your students learn about computers, the more your imagination will demand. So you'll want a computer that can grow with you as your skills and experience grow. Apple's the one.

How to learn more.
 The quickest way to learn more about desk-top computers is to request your free copy of Apple's Curriculum Materials Kit (specify level). Get yours by calling 800/538-9696; in California, 408/996-1010. Or by writing us. Then visit your local Apple dealer. We'll give you his name and address when you call.

*Apple II ships with one cartridge. It costs an extra \$100.00. © 1977 Apple Computer, Inc.

apple computer
 1000 Broadway Dr., Cupertino, CA 95014
 Reader Service Number 2

Early advertisement for the full color Apple-II.

We knew we had an exciting product and just knew we could sell

it, so we started to look for other people. Steve met the guy who is now our marketing manager; he worked for Intel. Then we hired another guy who was a friend of the marketing manager and he became president. He had been running a division of National Semi, where he had a lot of responsibility. His job was to keep an eye on the dollars and cents.

He's still our president. As for me, I was still working for HP until the first quarter of 1977. We hired two more engineers, including one guy from Atari who had a superb analogue background. We're now adding about 10 people a week still. We

have about 110 employees now; we also place a lot of contracts outside; so there are now many people working just on Apple – the total could be nearer to 200 full-time if you take these other companies into account

More Natural

We started slowly and that was a good thing. We had some really good exposure in the Press. We took on a good advertising agency – that's one of the first things we did – and the thing just took off from there.

Apple was beginning to be accepted; it was a more natural sort of product and it wasn't considered a brand new product any more – remember that at that time there were many companies coming out with really neat-looking products which might well be advertised in perhaps five issues of a magazine and then disappear.

So we finally made it to that point where our momentum was going to carry us. We knew we were going to survive unless something very drastic happened.

APPLE DESIGNER MUSES ON THE MICRO COMPETITION

Practical Computing May 1979

The first part of our interview with Steve Wozniak, founder of Apple Computer and principal designer of its products, ranged last month over the background to Apple and its meteoric rise. Our interviewer, Robin Bradbeer, then extracted from Steve some views and opinions about the microcomputer world.

RB: Steve, you said you regarded Apple II as "the first non-kit computer". Do you want to elaborate?

SW: Well, now of course there's the Commodore Pet and the Radio Shack TRS-80. We don't really think those two have equaled our machine, certainly not in its capability.



RB: Surely they're slightly different concepts?

SW: They are based on the same principle – a low-cost computer for the home, ready-to-use, plug-in-and-go, good manuals. Many of the new-comers fall down on good documentation; even so we didn't have good manuals in the beginning our-selves. We have them now – there's no substitute for good documentation.

Honestly, though the capability of the other two machines is just not as great. The development software available was just not as great, the application software was not in such good shape, the machines have video display limitations, they don't have color, they don't have high-resolution graphics. I still say we have

the best graphics of any of the small computers.

Similar Approach

RB: How about the hobby machines following the S-100 approach?

SW: Processor Technology is an interesting case; the Sol took a similar approach to the Apple I. It was a keyboard which you just plugged into the video terminal. With Apple I you didn't get a case; you do with Sol but it's based on a S-100 bus, and that's the ways things will go. Remember the original Altairs were based around teleprinters, because that was how it had been for years. Now it's video which really caught on in the hobbyist world. The Sol is basically an 8080 system with the Processor Technology VDM board and a keyboard all in a nice case. It was the hottest things going because that's what people wanted.

I think the term is "friendly"; Sol looks like an integrated computer system. In fact, the Apple II almost beat it, and when it came out it had a little more going for it than the Sol. It had a plastic case, it was well-designed, it looked more together, it had color graphics, of course, and it had the right RAMs.

RB: You really pushed Apple II?

SW: I admit it – "Here it is, the first computer really suitable for the home". The first advertisements showed the Apple II in somebody's kitchen and people started buying it; that really put us on the road. It really wasn't until we came out with our disc that our sales really took off. We were the only people really delivering a complete disc system.



Disc Important

RB: What do you think of the idea of having the disc integral with the system, rather as with the CompuColor 2?

SW: Yes, I like it. There are many advantages. The disc is so important, though. I remember when Shugart first came out with the floppy disc; I was still with HP and we didn't even have the Apple I designed.

We looked at the Shugart manuals to design a very simple interface but we never really got round to it until two years later, when we wanted to expand the Apple II peripherals. We felt that a disc was what it really needed, so I pulled out the old design and finally incorporated it.

The floppy disc is really the way to use the system. The minifloppy is a real credit to Shugart and its ingenuity. It was the first low-cost peripheral of that power that really gives you a good system, and it's so important for a personal computer that it makes sense to build it in.

Yes, I like the CompuColor approach; the concept is really good if they can get the manufacturing and reliability right.

RB: It looks like they have taken a few of your ideas and incorporated them, the colour graphics in particular?

SW: Well, CompuColor had a machine out about the same time as the Apple II. It was a different style from the one it has now; it had rather more capability. The colour scheme is rather different. They have a built-in CRT so they are able to

generate higher resolutions and more colours. They have dedicated more video RAMs to the system.

CompuColor-2 – a rival home computer system to Apple II which also featured full color video.

CompuColor originally wanted to come out with an \$800 system which had very limited colour graphics. But for some reason they haven't been able to sell it. I think there are problems with the disc being so close to the CRT – perhaps they have shielding problems, I don't know. If that machine had been built with Apple ideas, then I think it would have been a real winner.

What the world is really looking for is the machine with the best video resolution and the best colour possible. When you think about it, all it is is RAMs. It's not more complicated, it's just how much RAM you want to spend money on – and RAM is getting so cheap.

RB: What do you think the next generation of computers will have? For example what do you consider the minimum RAM content of any personal computer?

SW: Well 16K is our minimum now. No-one in their right mind would order a 4K Apple. Disc operating systems call for quite a bit of RAM. The TRS-80 and the Pet are in a rather difficult position because they were not really designed for up-grading like that to a helpful memory capacity, but Apple II was designed to plug 48K into the main board. That was unheard of.

I think we can see the time when we'll want more than 64K and that's going to be a real problem with some of the current micro-processors.

More Storage

RB: What do you think about the 16-bit micro?

SW: Well, we could go to one for Apple. But then you have problems with some of the current 16-bit machines which don't really address any more memory than the 8-bit micros, The Intel 8086, for instance,

uses a segmentation scheme but you are still stuck with about 65K bytes in any one segment.

RD: *Zilog is talking about a lot more storage than that or the Z-8000, I believe?*

SW: Yes, they use a 23-bit addressing system with various different addressing modes. In fact that's probably the first big step forward, But then if its available you want 256K bytes. If I generate an instruction which refers to a data field offset from some base register by up to 64K. I can use a normal 16-bit offset. If I exceed that, however, I can use a 23-bit offset and address as much memory as I want.

So hot

RB: *When you were with HP did you meet its 16-bit microprocessor?*

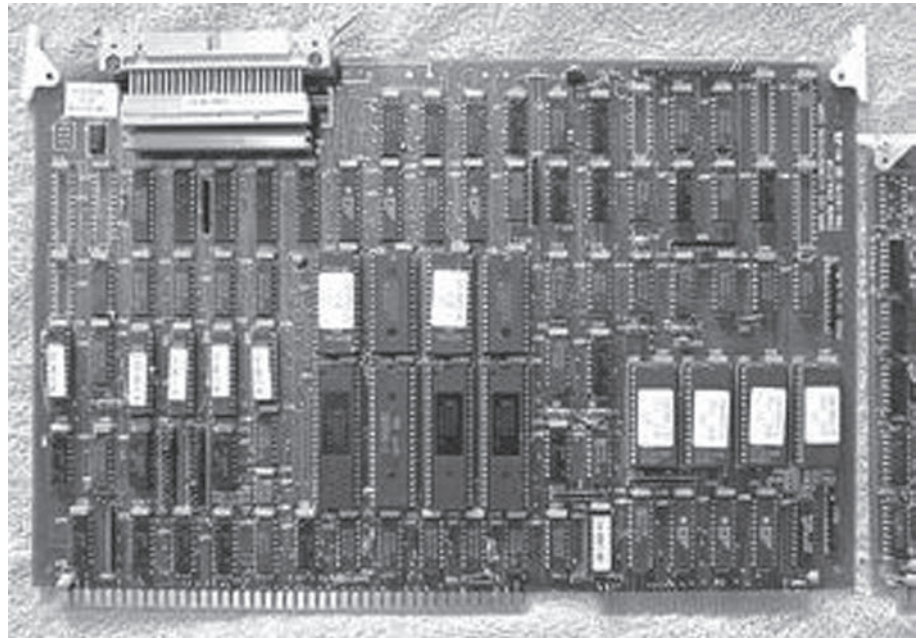
SW: Before I left I saw a description of one called the MC2 that was in SOS. At the time they were talking about 7MHz operating speeds although It think it been reduced a little. The addressing modes and the instruction set looked to be very similar to other micro-processors around.

If it had been released as a "hobbyist" type product it would have been so hot; it would really have caught on because it was so powerful. But HP used it only for internal use. There must be a couple of different processors running around the divisions of HP.

RB: *Isn't it a shame HP doesn't sell its processor products outside the company?*

SW: Yes. When I was beginning to get into processors HP had SOS and NMOS 16-bit chips going and would have been way ahead.

HP isn't a component manufacturer, though, and it would probably have been a bad move to enter the microprocessor component market. When the Z-80 appeared it was in advance on the other products around and Zilog went into the black within one year of producing it. It really sold like hot cakes. Zilog



Z-8000 micro-computer system from late 1970's

SY6500
8-Bit Microprocessor Family

Part Number	Clocks	Pins	IRQ	NMI	RDY	Addressing
SY6502	On-Chip	40	✓	✓	✓	64K
SY6507	-	28	✓	✓	✓	8K
SY6512	External	40	✓	✓	✓	64K

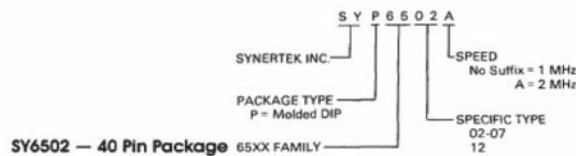
Features

- Single 5 V ±5% Power Supply
- N Channel, Silicon Gate, Depletion Load Technology
- Eight Bit Parallel Processing
- 56 Instructions
- Decimal and Binary Arithmetic
- Thirteen Addressing Modes
- True Indexing Capability
- Programmable Stack Pointer
- Variable Length Stack
- Interrupt Capability
- Non-maskable Interrupt
- Use with Any Type or Speed Memory
- Bi-directional Data Bus
- Instruction Decoding and Control
- Addressable Memory Range of up to 65K Bytes
- "Ready" Input
- Direct Memory Access Capability
- Bus Compatible with MC6800
- Choice of External or On-board Clocks
- 1 MHz, 2 MHz Operation
- On-chip Clock Options
 - External Single Clock Input
 - Crystal Time Base Input
- 40 and 28 Pin Package Versions
- Pipeline Architecture

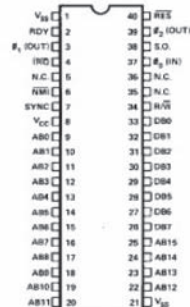
Description

The SY6500 Series Microprocessors represent the first totally software compatible microprocessor family. This family of products includes a range of software compatible microprocessors which provide a selection of addressable memory range, interrupt input options and on-chip clock oscillators and drivers. All of the microprocessors in the SY6500 family are software compatible within the group and are bus compatible with the MC6800 product offering.

The family includes six microprocessors with on-board clock oscillators and drivers for four microprocessors driven by external clocks. The on-chip clock versions are aimed at high performance, low cost applications where single phase inputs or crystals provide the time base. The external clock versions are geared for the multi-processor system applications where maximum timing control is mandatory. All versions of the microprocessors are available in 1 MHz, 2 MHz, 3 MHz and 4 MHz maximum operating frequencies.



SY6502 — 40 Pin Package 65XX FAMILY



Features

- 65K Addressable Bytes of Memory
- IRQ Interrupt
- On-the-chip Clock
 - ✓ TTL Level Single Phase Input
 - ✓ Crystal Time Base Input
- NMI Interrupt
- SYNC Signal (can be used for single instruction execution)
- RDY Signal (can be used for single cycle execution)
- Two Phase Output Clock for Timing of Support Chips

Datasheet of the Synertek 6502 - one of Woz's favorite CPU's!

Synertek (C) SMITHSONIAN INSTITUTION NMAH 1984.0154.01

QUICK-START GUIDE TO PREPARING CONTENT FOR CE MAGAZINE

Scope of Articles: they should be more broadly scoped than for an archival journal – typically review and tutorial articles are particularly suited to the Magazine. Technical articles may be suitable but these should be of general interest to an engineering audience and of broader scope than regular technical papers.

Articles related to the background story behind engineering standards or practical experiences in product specification and design are particularly welcome as are articles on the social impact of CE. Tutorials on CE related technologies or techniques are also encouraged.

Outline Instructions for Content: first point is that there is not a fixed template for magazine articles. Where possible text should be provided separately from images/graphics and may be in Word or Laytex format. Original images/graphics are preferred, rather than those embedded in Word documents

as these reproduce better for magazine printing. You may include a PDF with suggested layout of your article if you wish.

Copyright Issues: One very important difference between CE Mag and Newsletter is that IEEE requires copyright assignment for the Magazine. That means that you must have obtained permission for any 3rd party images you wish to

use. Some limited use of figures and diagrams would be allowed under fair rights usage, provided the original source of the content is correctly referenced.

Submitting Content: a ScholarOne website is currently under testing and will become active, hopefully by early October 2011. The URL for this site is <http://mc.manuscriptcentral.com/cemag>.

Fields of Interest: Some Example Fields of Interest Include.		
Digital Broadcast & HDTV	Smart-Grid & CE	Displays for CE
Interactive & Immersive TV	Home Networks & Services	Storage & Digital Media
Smart Imaging & Cameras	Audio Systems & Technologies	CE & Digital Content Issues
Mobile Devices	Security & Rights Management	Device Interconnects
Digital Video Processing & Codecs	HCI & User Interface	Haptics & Multi-Touch
3D Imaging & Display	Wireless & RF in CE	CE Image Processing
Home Healthcare	New & Emerging Technology	Gaming Devices & Systems
Social & Economic Impacts of CE	Wireless Sensor Nets in CE	CE & Cloud Computing

has a really good pulse on the market and where it is heading.

RB: Do you think that the memory management approach is one good way of handling 16-bit machines?

SW: The Z-8000 is still a 16-bit bare address machine with a segment register. At least you have the large offsets available in the instruction set, if you were coding in absolute. Now nobody really codes in absolute any more.

RB: Will you stay with 6502-based products – the first two machines both used this microprocessor?

SW: That was a total accident.

RB: As it was the first chip you picked up? Would you have done the same things if somebody had given you a 68000?

SW: It didn't really matter. My first version of the Apple I was designed with the 6800 but then I read in a magazine that the 6502

was a little better, and it was also sold over the counter. Any microprocessor with a reasonable instruction set could have been used

RB: Do you think that that was the way most personal computer manufacturers chose their products?

SW: Yes. Most of the small computer manufacturers were starting when the Altair came out; Altair used the 8080, and many followed them. When I saw the 6502, I thought that it was really nifty, and I wanted to do something which hadn't been done before. It was largely accidental. But when the large companies step in they think about it – they are more concerned about the supply than the raw performance.

Popularity

RB: The 6502 is becoming more and more popular. Is this because people like

you are using it, or is it because it is a good processor?

SW: Well, Apple has done an awful lot for the 6502. Now three companies are making it – Rockwell, Synertek and, of course, MOS Technology – it is getting around the OEM world.

RB: How significant is Europe in your marketing?

SW: Europe is a significant proportion of our sales, most of the systems going into small businesses. In the U.S. it's more of a market for personal computers in the home. The TV video systems are different.

PAL we can live with, it's not too different from NTSC – but the French system SECAM is another thing altogether. It's a pity the world doesn't use the same video standard, though it is doubtful if we'll ever get one video standard, the same as we probably won't get one standard bus structure.

CE NEWS BYTES

As part of our program to migrate towards a fully-fledged magazine next year I have introduced the follow set of “news” from the world of Consumer Electronics. These newsbytes are drawn from various sources that pop into my mailbox and I’ve compiled some of the more interesting ones over the last couple of weeks.

If you like this section or HATE it, please tell me? cesmagazine@ieee.org

Also, as we migrate towards the full magazine I will be looking for an associate editor to take over the gathering of CE related news items. If you are looking to help out in the CE Society this might be your opportunity!

Contact me at cesmagazine@ieee.org if you are interested.

CE Memory Lane

Thirty years ago, on July 27 1981, Microsoft bought the rights for QDOS (Quick and Dirty Operating System) from Seattle Computer Products (SCP) for \$25,000. QDOS, otherwise known as 86-DOS, was designed by SCP to run on the Intel 8086 processor, and was originally thrown together in just two months for a 0.1 release in 1980. Meanwhile, IBM had planned on powering its upcoming Personal Computer with an Intel 8086-compatible version of CP/M, which was the standard OS for Intel 8080 and other 8-bit architectures at the time, but a deal could not be struck with CP/M’s developer, Digital Research. IBM then approached Microsoft, which already had a few years of experience under its belt with M-DOS¹, BASIC, and other important tools – and as you can probably tell from the landscape of the computer world today, the IBM/Microsoft partnership worked out rather well indeed.

IBM released its Personal Computer in August 1981 running version 1.14 of SCP’s QDOS – but a few months later Microsoft produced MS-DOS 1.24, which then became the standard IBM PC operating system. In March 1983, both MS-DOS 2.0 and the IBM PC/XT were released. The rest, as they say, is history. MS-DOS 3.0 followed in 1984



I remember those 5” floppy disks, Hercules graphics cards and Notepad 1.0!

(alongside the IBM PC/AT), and MS-DOS 4.0 with a mouse-powered, menu-driven interface arrived in 1989. It’s around this point that IBM’s PC operating system, PC-DOS, began to diverge from MS-DOS – and of course, come 1990, Microsoft released Windows 3.0, which would change Microsoft’s focus forever. It’s also around this time that developers start to feel the pinch of the 640KB conventional memory limit imposed by IBM’s original hardware specifications.

Still, come 1991, MS-DOS 5.0 was released (along with the much-loved QBASIC), and MS-DOS 6.0 with much-maligned DoubleSpace disk compression tool appeared in 1993. By this stage, IBM, Digital Research (DR-DOS), and Microsoft were all leapfrogging each other with differ-

ent version numbers and features. IBM released PC-DOS 6.1, and MS followed quickly with MS-DOS 6.2. IBM released PC-DOS 6.3 – and Novell trumped them all by releasing Novell DOS 7.0. In 1995, however, Windows 95 with an underpinning of MS-DOS 7.0 and its new FAT32 file system was released, and the history of DOS draws to a close. Every other version of DOS was quickly squished out of existence by Windows 95, and it wouldn’t be until the late 90s and the emergence of the Dot Com Bubble that another command-line OS would yet again rise to prominence in the shape of Linux.

Wikipedia has an excellent account of the history of x86 DOS operating systems², and also a table that compares and contrasts each of the different versions from IBM, MS, Digital Research, and others. If you’re interested in the original development of QDOS, check out its creator’s blog³.

Interactive & Web TV

Returns Outpace Sales for Google TV

Posted to <http://online.wsj.com/> on 29th July by John Letzing

Consumers dislike Google TV so much that they are now giving the

¹<http://en.wikipedia.org/wiki/M-DOS>

²http://en.wikipedia.org/wiki/Timeline_of_x86_DOS_operating_systems

³<http://dosmandrive1.blogspot.com/>

product back. Gadgets that use the company's Google TV software to connect televisions to the Internet are selling so poorly that one of Google's key partners disclosed Thursday that customer returns are outpacing sales.

Logitech International SA, which makes the Revue set-top box and special keyboard built on the search giant's technology, said Revue revenue was "slightly negative" in the latest quarter as more units were returned than purchased. "There was a significant gap between our price and the value perceived by the consumer," explained Logitech Chairman Guerrino De Luca, in a conference call Thursday.

In a bid to spur sales, Logitech said it would lower the Revue's price to \$99 from \$249. The Swiss company had earlier this year cut the price from \$299. While Mr. De Luca admitted his company misjudged the market, he said: "We launched Revue with the expectation that it would generate significant sales growth in spite of a relatively high price point and the newness of both the smart TV category and the underlying platform ... In hindsight, there are a number of things we should have done differently."

The lackluster performance of the Revue marks a setback for Google Inc.'s television ambitions. The company unveiled its Google TV software to much fanfare at its developers conference last year. The product was part of the company's broader push to become a force in the distribution of TV shows, movies and other media content.

However, Google faced resistance from major networks, which worried their businesses would be undermined if their programming was made available via Google TV. The device was also dogged by complaints that it was complicated to use.

A Google spokeswoman said "It's still early days for smart TVs and we're investing to continue to bring innovation and progress for our

partners and users," she said. The company will provide users with an updated version of Google TV later this year, she said.

(Read more: <http://online.wsj.com/article/SB10001424053111904800304576474581913302222.html#ixzz1ToSKc1dY>)

Interactive & Web TV

We Want TV Apps, But Only Those We Know!

Posted to <http://www.mediapost.com/> on 4th August by Steve Smith

The age of the app is upon us, and it is creeping to the TV set. Even as we wait for Google TV and Apple TV finally to activate Android and iOS app on their respective devices, connected TV sets are picking up momentum and may be capturing viewers' hearts with their built-in apps. According to a new ethnographic study by Strategy Analytics of a dozen owners of connected TVs in the U.S. and UK, app love actually does creep up on you in the living room. None of the people studied in this intensive, in-home research had purchased their new TVs with app-capability in mind. Price, picture quality, screen size and technology all trumped apps as determining factors.

And yet, once these connected TV owners started using the app, they embraced the platform and within six months were not willing to give up the feature.

It turns out that this is good news for familiar media brands and not so much for the Web upstarts that see connected TV as a way to acquire new viewers. Overwhelmingly, this group relied on apps from brands they already knew from other platforms like the web and smart-phones. The most popular TV apps were Pandora, Hulu Plus, Netflix, YouTube and the BBC iPlayer.

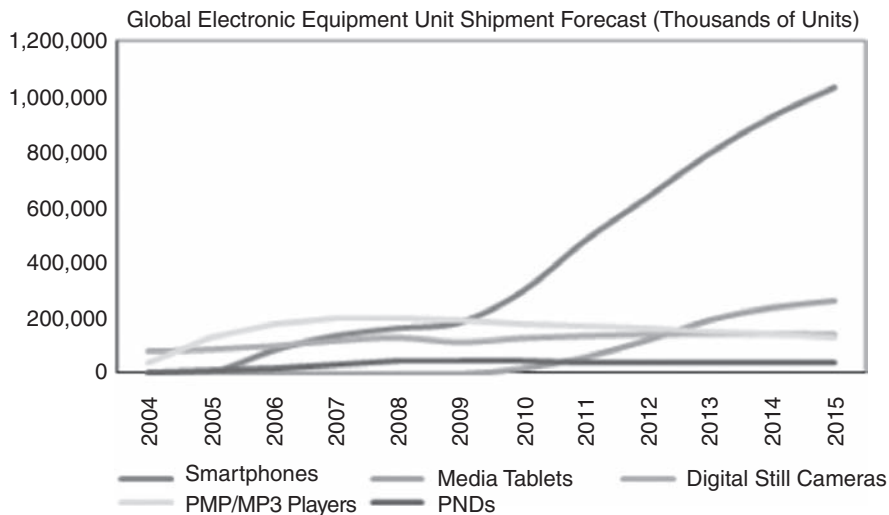
But more than familiar, the TV apps had to be lean-back experiences. Highly interactive but otherwise ubiquitous services like email

and even Facebook did not fare well. Not surprisingly, people don't want to type on their TV and the only social media that interests them is related to content.

Analyst Kevin Nolan says part of the challenge in the TV app universe is that people still don't know what these things are and how they work. "Consumers want to know, 'where is 'Family Guy?' where is 'Doctor Who?'" and the TV app interface doesn't help them to intuitively find what they are looking for. It's little surprise then that they default back to using apps/services that they are familiar with from their smart-phone or PC experience."

In fact, the presence of apps on TVs may not change behaviors quite in the way we might think. The researchers found that "apps did not alter how much they watched, or even what they watched, it simply provided them with more flexibility to watch their content when and how they wanted," says Nolan. And that is what people are really after – flexibility, not discovery. "The DVR removed the need to schedule TV around their lives," he adds. "Now on-demand access has removed the need to even record content. This flexibility is what they said they could not give up after having it."

But where does this leave the rest of the online video ecosystem if viewers aren't using the platform to discover new content? Nolan advises that content providers not mistake distribution for marketing. Getting onto the TV with an app is not the challenge; giving people reasons to use it is. Nolan likens it to the early days of the Web and suggests we not repeat the build-it-and-they-will-come errors of the past. "They mistakenly thought that the website WAS the marketing. In a similar manner, I think content companies are mistaking apps, on mobile or on TVs, for the marketing tool rather than simply a new delivery mechanism which still needs to be promoted."



Source: IHS iSuppli, July 2011

Tablet Computing

Tablets, Smartphones Hit Sales of CE Devices

Posted to <http://www.eetimes.com/electronics-news/> on 28th July by Dylan McGrath

Rapidly growing sales of multi-function products like media tablets and smartphones are coming at the expense of demand for single-task consumer electronics products, according to market research firm IHS iSuppli, which projects sluggish sales for single-task devices like MP3 players and digital still cameras through at least 2015.

Shipments of smartphones and tablets will rise at compound annual growth rates (CAGRs) of 28.5 percent and 72.1 percent, respectively, for the years 2010 to 2015, according to IHS. Meanwhile, shipments of portable navigation devices (PNDs), portable media players (PMPs)/MP3 players and

digital still cameras (DSCs) will either decline or remain flat during the same period of time, according to the firm's projections.

The long predicted trend of consolidation of applications in smartphones is already having major ramifications on the consumer electronics market. Earlier this year, when networking giant Cisco Systems Inc. announced it would discontinue the popular Flip handheld video recorder, many analysts and observers concluded that increasing video capability in smartphones was at least part of the reason.

Tablet Computing

Internet Enabled Consumer Devices Will Soon Outsell PCs

Posted to <http://www.telecompetitor.com/> 11th August, by Joan Engebretson.

Shipments of Internet-enabled consumer devices will exceed PC shipments in 2013 and tablet devices will lead the way, predicts a new iSuppli Consumer Platforms Report from information and research firm IHS.

The entire category of Internet-enabled consumer devices will see sales of 503.6 million units in 2013, up from 161 million in 2010, IHS says. In comparison, PC shipments will increase to only 253.3 million

over the same period—up from 222.3 million in 2010.

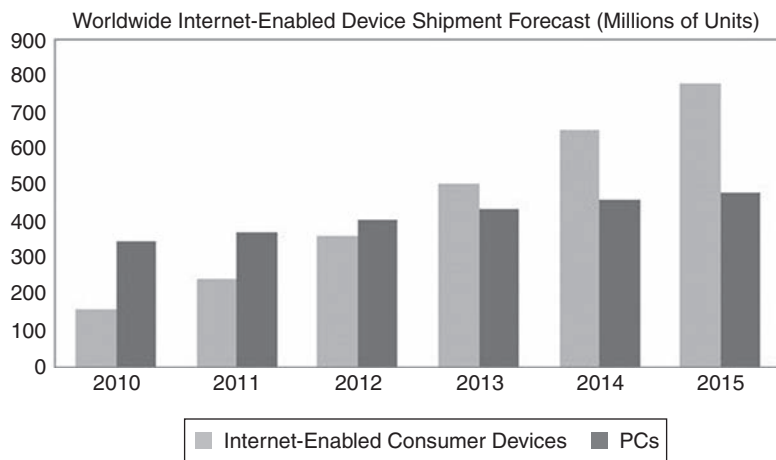
According to IHS, Internet-enabled consumer electronics devices include a wide range of products—from televisions to video game consoles and Blu-ray players. But although game consoles were the top selling Internet-enabled consumer devices with shipments of 50.5 million units last year, IHS projects that they will be displaced this year by tablet devices, which are projected to have shipments of 61.9 million.

"From virtually nonexistent levels just two years ago, media tablets will ship more than 300 million units by 2015, 15 times greater than in 2010, for a five-year compound annual growth rate of 73.3%," wrote IHS in an announcement of the new report findings. IHS added that "the media tablet appears to be the device that will pull customers into the era of the digitally connected home" because "it allows users to enjoy media—and not just content stored locally on the device for viewing on the included display."

The researcher firm noted that "consumers can push music from an iPad to an audio system or drive video to a large-screen display." The firm also noted that it expects the media table to be "one of the first devices to fully integrate into the connected home" as a result of vendor support for Apple's AirPlay standard.

While the forecast from IHS about tablet devices may sound bullish, the firm's findings are largely in keeping with other tablet developments that Telecompetitor has noted in recent months. Nielsen noted recently that one in three tablet owners see a decline in computer usage. And cable operators certainly seem to be aware of the potentially disruptive impact that tablets could have on their market. Further evidence of how ingrained tablets have become in users' lives is other Nielsen research which showed that 57% of tablet owners like to use them while lying in bed.





Source: IHS iSuppli August 2011

CE at Home

New Apple-Based Home Automation System Taps the Cloud

Posted to <http://www.cepro.com/> 1st August, by Julie Jacobson.

There's a new Mac-based home automation game in town. It's called ClareHome and it comes from a new company called Clare Controls – well, not entirely new. Clare founder Brett Price is president of the integration firm Tempus Electronic Lifestyles based in Sarasota, Fla.

ClareHome is billed as “the first home automation system managed from the cloud and run on a Mac.” The original manufacturer of Mac-based home automation for the channel, Savant Systems, might beg to differ. But it seems there is a slightly more substantial “cloud-based” component with Clare. The system runs on a Mac Mini, but all of the apps for the system (initially) reside in the cloud. Some of them can be downloaded (purchased, presumably) by consumers themselves; others, like drivers for certain subsystems, are available only through dealers – kind of like Control4's 4Store app store, but more of it.

Clare calls its drivers AppModules, and they are written for most of the popular subsystems:

- AV systems from Crestron, Atlona, Nuvo and others
- Lighting systems from Lutron, Crestron, LiteTouch and Vantage
- Security systems from GE and ELK
- Water feature controls from Jandy and Pentair

In addition, over 3,000 IR devices are supported, according to the company.

The new product is an interesting blend of DIY and CE Pro. Consumer can configure scenes, email and SMS alerts, schedules and other events via an intuitive interface – not unlike that of iControl, Motorola 4Home and other mass-market, cloud-based (SaaS) solutions. But the system is sold only through professional installers and integrates with professional-grade subsystems.



3D in CE

Fewer Consumers Intend to buy a 3DTV

Posted to <http://www.twice.com/> on 27th July by Greg Tarr

Port Washington, N.Y. – The NPD Group said its recent research has found that although more American consumers have been exposed to 3D video at movie theaters, retail venues, and in homes of friends and family, the overall awareness and purchase intent for specific 3D products declined in May 2011 from last October.

“With the run-up to the holiday purchase season, the intent to purchase 3D televisions followed the purchase intent to buy TVs in general,” stated Ross Rubin, NPD Group industry analysis executive director. “As NPD's sell-through data shows, sales of 3D TVs did indeed rise during the holiday season, but they have since receded due to the seasonality of major electronics purchases.”

“For the majority of consumers who weren't interested in purchasing any 3D devices, glasses were the major barrier to purchasing, surpassing price as the most frequently cited objection,” NPD said. But the study found that consumers are starting to warm up to portable 3D experiences, most of which do not require special glasses. Portable handheld 3D video-game consoles experienced the biggest increase in consumer awareness of any 3D category NPD tracks. The research firm attributed much of this to the launch of the Nintendo 3DS in February.

Awareness of this 3D category rose from 5 percent last October to 13 percent in May, the study showed. The Nintendo 3DS has a low price compared to a 3D television and doesn't require glasses to view the effect. These advantages will also hold true for 3D smartphones entering the market this year.”

With lighter and less-expensive active-shutter glasses, a mix of smaller displays, and the entry of



passive 3D technologies into the market, the industry is offering more 3D options to consumers. A greater array of Blu-ray titles, along with new digital delivery alternatives, is also helping to ease the path to 3D entertainment.

Gaming Platforms & Technologies

Nintendo Price Cut Acknowledges Competition

Posted to <http://www.mediapost.com/> on July 28, 2011 by Aaron Baar

Nintendo's surprise announcement that it would cut the price of its recently launched 3DS handheld gaming system by a third is as much about trying to maintain leadership in an increasingly competitive environment as it is about trying to goose the lagging system's sales. "Clearly [sales are] part of it," David Cole, president of gaming market analysis company DFC Intelligence, tells *Marketing Daily*. "I think the other side of it is Sony launching a new system at a compelling price point means that the competition is going to be rough going forward."

The maker of the Gameboy, DS and DSi has long held the market leadership position of handheld games, Cole notes. But increasing adoption of tablets and smartphones as a gaming platform and the scheduled launch of Sony's

handheld Vita system could threaten that. "They seem to be willing to take a loss to maintain that market position," Cole says. "It really says they were looking at the competition and wanted to respond aggressively."

Regardless, sales of the much-hyped glasses-free 3D gaming system have been disappointing. In the U.S., only 830,000 units have been sold since the device's release in late March. By reducing the price by \$80, from \$249.99 to \$169.99 (effective Aug. 12), the company is hoping to goose sales going into the holiday season. Sony's Vita, which will include WiFi and 3G wireless capabilities, has been initially priced at \$249, and is expected by the holiday season.

"Never in Nintendo's history have we lowered prices to such an extent, less than half a year since the product launch," wrote Nintendo president and CEO Satoru Iwata, in a letter posted online (according to the *New York Times*). "But we have judged that unless we move decisively now, there is a high possibil-

ity that we will not see many of our customers enjoying a Nintendo 3DS."

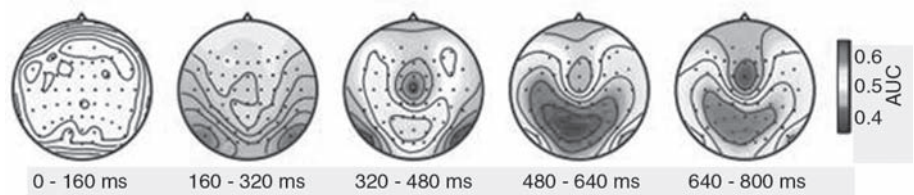
CE Foundation Technologies

Car Braking System Taps Directly into the Brain

Talk about cutting out the middleman. A mind-reading device that taps into a driver's brain can recognize and act on the brain signals to stop the car precious milliseconds before the signals become leg movements. Some cars carry systems to detect traffic danger, and will then stop the vehicle the moment the driver touches the brake. Stefan Haufe from the Berlin Institute of Technology in Germany says plugging into the driver's thoughts could make response times even faster.

With colleagues, he wired 18 volunteers to an EEG headset, a non-invasive way to measure brain activity, and asked them to drive at 100 kilometers per hour in a car simulator, closely following the car in front. The EEG measured patterns of brain activity as drivers were forced to brake suddenly. It recorded three distinct patterns, which the team were able to use to detect the intention to brake before the driver moved, says Benjamin Blankertz, also at TU Berlin, who co-lead the study. Sensors on the drivers' legs to monitor muscle tension provided another way to confirm the intention to brake.

The system reliably triggered the braking system 130 milliseconds sooner than waiting for the driver to touch the pedal. At 100 km/h that reduces the stopping distance by the length of a small car – potentially enough to prevent an accident.





Journal reference: Journal of Neural Engineering, DOI: 10.1088/1741-2560/8/5/056001

With 20.3 million iPhones shipped in the quarter, Apple was a distant second with 19% share. Still, Apple's iOS platform for the first time overtook Nokia's Symbian operating system. A separate report from Strategy Analytics last week found Apple had dethroned Nokia as the No. 1 smartphone seller by volume, with an 18.5% share. Nokia fell to third with a 15.2% share, behind Samsung at 17.5%.

"It's an impressive success story, given that Apple has only been in the smartphone market for four years," said Chris Jones, principal analyst at Canalys. "With the next-generation iPhone anticipated in Q3, it's likely that Apple's position will grow even stronger in the second half of the year."

While Android and iOS gobble up share, Microsoft's newer Windows Phone platform is barely a blip on the radar. Windows Phone, which will not roll out widely on Nokia phones until next year, has captured just 1% share – down 52% from a year ago (including Windows Mobile sales). Through the Microsoft-Nokia alliance, the next version of Windows Phone, called Mango, will power Nokia smartphones.

Microsoft reportedly only took in only \$613 million from sales of Windows Phone 7 handsets and other devices including the Zune. By comparison, revenue from the Xbox 360 platform was \$8.1 billion.

Microsoft said in January it had sold 2 million Windows Phone devices following their October 2010 launch, but has provided little sales information since.

BlackBerry maker Research in Motion also continues to struggle. It saw an especially steep slide during the second quarter in North America, where its share has fallen to 12% from 33% a year ago. Canalys, however, noted that RIM's global shipments grew 11% last year and that BlackBerry still has strength in emerging markets, such as Latin America, Indonesia and South Africa, where it's still the top smartphone vendor.

"Nonetheless, it must continue to innovate and recapture lost momentum," the firm stated. "It's critical that the next-generation BlackBerry OS 7-based products launch ahead of the upcoming holiday season to compete in the market."

Cloud Computing

Cloud Computing and Internet Use Suck Energy, Emit CO₂, Says Greenpeace

Posted to <http://latimesblogs.latimes.com/technology/> on April 22, 2011 by Tiffany Hsu

Clicking on all those viral videos, chain emails, celebrity tweets and paparazzi photos online sucks up enough energy to rank the Internet—if it were a country—fifth in the world for electricity use. That's more power than Russia uses, according to a new report about cloud-computing from Greenpeace.

Computer servers in data centers account for about 2% of global energy demand, growing about 12% a year, according to the group. The servers, Greenpeace said, can suck up as much power as 50,000 average U.S. homes.

But most of what powers the cloud comes from coal and nuclear energy rather than renewable sources such as wind and solar, according to Greenpeace. Clusters of data centers are emerging in places

like the Midwest, where coal-powered electricity is cheap and plentiful, the group said.

The report also cites Jevons Paradox that argues that reducing the cost of computation through data centers may actually lead to increased demand and thus higher electricity usage. For this reason it is doubly important that data centers are sited in locations where "greener" sources of energy are available so that any increased electricity usage is environmentally sustainable. Unfortunately this is often not the case.

In its report, entitled "How dirty is your data?", the organization zeroed in on 10 major tech companies, including Apple, Twitter and Amazon. Recently, the group has waged a feisty fight against Facebook, which relies on coal for 53.2% of its electricity, according to Greenpeace. Many companies, the organization said, tightly guard data about the environmental impact and energy consumption of their IT operations. They also focus more on using energy efficiently than on sourcing it cleanly, Greenpeace said. Yahoo landed bonus points for locating facilities near clean energy hot spots and using coal-based power for just 18.3% of its portfolio. Google got love for its extensive support of wind and solar projects and for creating a subsidiary, Google Energy that can buy electricity directly from independent renewable power producers.

The full report is available at:

<http://www.greenpeace.org/international/Global/international/publications/climate/2011/Cool%20IT/dirty-data-report-greenpeace.pdf>

Consumer Imaging

Kodak to Sell its Crown Jewels?

Posted to <http://online.wsj.com/> on 2nd August, by Dana Mattioli

Eastman Kodak Co. is exploring a sale of one the company's crown jewels: the patent for previewing photographs currently being litigated against Apple Inc. and



So that's why they call it "Cloud Computing" ...

Research In Motion Ltd. The imaging company recently said it is considering the sale of 1,100 patents, or 10% of the company's portfolio. Kodak said the patents at stake covered capturing, storing, organizing and sharing digital images, but didn't specify whether the sale would include the one at issue in the Apple and RIM lawsuits.

Kodak now acknowledges the image-previewing patent is up for sale, as well as patents that Kodak is litigating against Shutterfly Inc. The move makes clear Kodak's eagerness to raise cash after two straight quarters in which patent litigation income dried up, contributing to losses.

Kodak is concerned an investor might try to gain control of the patents—which could be worth more than the company's market value of \$650 million—by buying up a big stake in Kodak itself, a person famil-



iar with the matter said. The image-preview patent has been crucial to Kodak's strategy of using intellectual property suits to fund its development of consumer and commercial printers, the businesses it hopes will offset its declining film sales.

To date Kodak settled image-preview suits and signed licenses with 32 companies. The company raised \$550 million settling lawsuits over image previewing with

Samsung Electronics Co. in 2010 and \$400 million with LG Electronics Inc. in 2009.

Chief Executive Antonio Perez has been using Kodak's intellectual property as a means of funding the company's long and expensive transformation. In 2008, Mr. Perez put forth a goal to generate between \$250 million and \$350 million a year from Kodak's patent portfolio. The strategy hit a snag this year as U.S. International Trade Commission extended its investigation into whether Apple and RIM violated Kodak's patents. The lengthy investigation has prevented Kodak from collecting intellectual property related funds for the first half of this year.

Read more:

<http://online.wsj.com/article/SB10001424053111903520204576481873564181778.html#ixzz1TxWbN6x>

FOCUS ON IPAD2

Editor's Note: You'll see a lot in this month's news bytes about tablet devices. You may also have read my article a couple of issues ago about the history of tablet computing. There is no doubt that Apple has succeeded in re-inventing tablets for the consumer electronics market and this issue we feature a focus on their next-generation tablet device – the iPad2 – which was released earlier this year and has sold in unprecedented numbers. A device overview is followed by a device teardown – thanks to <http://www.ifixit.com/> and Kyle Wiens for the teardown content and you can find a full, step-by-step teardown guide on the iFixit website.

IPad2 – Device Overview

Apple unveiled the device on March 2, 2011, began selling it by website and retail stores on March 11, and released it in 25 other countries on March 25, including Australia, Britain and Canada. Many stores in major cities, such as New York, sold out within hours. Online shipping delays had increased to three to four weeks on Sunday and four to five weeks by Tuesday.

One analyst predicted that Apple would sell 35 million iPad 2s in 2011, noting that the iPad is more advanced yet cheaper than most other tablets.¹

¹Adam Satariano (March 11, 2011). "Apple Poised to Sell 600,000 iPad 2s in Its Debut, Outpacing First Model". BLOOMBERG L.P. Retrieved March 14, 2011. [<http://www.bloomberg.com/news/2011-03-11/apple-poised-to-sell-600-000-ipad-2s-in-its-debut-outpacing-first-model.html>]

Hardware

The iPad 2 includes a new A5 processor, front and rear cameras plus a 3 axis gyroscope. Several components were made smaller to fit the new iPad. Apple claims this doubles processing speed and has graphics processing that is up to nine times faster than the previous iPad.

Screen and input

Both original iPad and iPad 2 have four physical switches, including a home button near the display that returns the user to the main menu, and three plastic physical switches on the sides: wake/sleep, volume up/down, and a third switch for either screen rotation lock or mute. The home button on the iPad 2 is "easier to double tap" than the previous generation of the iPad.

Apple reduced the size of the iPad by eliminating the stamped sheet metal frame from the display, integrating new thinner glass technology for the touch screen overlay, and slightly reducing the space between the display and battery. The iPad 2's screen is thinner, lighter, and yet stronger than the original iPad's. The iPad 2 also supports screen mirroring via the digital AV adapter.

Power

The iPad has a 25 watt-hour rechargeable lithium-ion polymer battery that lasts 10 hours, like the original iPad. It is charged via USB or included 10-watt, 2-amp power adapter. The battery is 2.5 mm thick, 59% smaller than the original and has three cells instead of two. The improvements allowed the injection-

molded plastic support frame to be omitted. The 10W USB power adapter provides 4x the power of a conventional USB port.

Cameras

The revised tablet adds front- and rear-facing cameras, which allow FaceTime video calls with the iPhone 4, fourth-generation iPod Touch and Macintosh computers (running Mac OS X 10.6.6 or later with a webcam).

The 0.3MP front camera shoots VGA-quality 30 frame/s video and VGA-quality still photos. The 0.7MP back camera can shoot 720p HD video at 30 frame/s and has a 5x digital zoom. Both shoot photo in a 4:3 fullscreen aspect ratio. The rear camera shoots video in 16:9 wide-screen to match the 720p standard, although only the central 4:3 part of the recording is shown on the screen during recording. The forward facing camera shoots in 4:3.

Size and weight

The device is 15% lighter and 33% thinner than the original iPad, it is thinner than the iPhone 4 by 0.5 mm.

The Wi-Fi version is 1.33 lb (600 g). Both the GSM and CDMA versions differ in weight slightly due to the mass difference between the GSM and CDMA cellular radios, with the GSM model at 1.35 lb (612 g) and the CDMA model at 1.34 lb (608 g). The size of the iPad 2 is also less than the original iPad at only 9.5 × 7.31 × .346 in (240 × 186 × 8.8 mm), compared to the original iPad's size at 9.56 × 7.47 × .528 in (243 × 190 × 13.4 mm).

IPAD 2 (WI-FI) – DEVICE TEARDOWN

Please note that if you are going to attempt this on a real-world iPad you should definitely refer to the full teardown article at: <http://www.ifixit.com/Guide/Repair/Installing-iPad-2-GSM-Wi-Fi-Antenna/6166/1>

[NB: Any tear-down you attempt is your own responsibility and neither the CE Soc Newsletter nor Ifixit.com shall be in any way liable in any way for the consequences of a failed disassembly of any iPad2 or its component hardware. This article is for informational purposes only.]



Finally!!! The iPad has come back to iFixit! And this time, it has a 2 at the end of its name, hence the iPad 2!

After a much awaited debut, the iPad 2 is expected to fill in the gaps left by the first generation iPad.

Tech Specs:

1 GHz Apple A5 dual-core processor
512 MB of LPDDR2 RAM
16/32/64 GB internal storage capacity
9.7" LED-backlit glossy Multi-Touch display with IPS technology(1024 × 768)
HD (720p) Rear-facing camera + VGA Front-facing camera



The iPad 2 is an extremely difficult device to open. Before attempting this guide, be aware that you may break your front panel and/or deform the plastic bezel around it during the opening sequence.

In the following steps you will use a heat gun to soften the adhesive securing the front panel to the rear panel. Try not to allow the stream of hot air to contact the thin plastic strip around the outer perimeter of the front panel as it may melt, permanently deform, and lose texture.

When heating up the front panel, the goal is to loosen the adhesive located in the areas highlighted in red in the second picture. When prying up the front panel, be especially careful not to damage the Wi-Fi antenna in the area boxed in blue, the top antennas in the area boxed in yellow, or the digitizer cable in the area boxed in black in the second picture.

Detailed step-by-step instructions to remove the front panel can be found at: <http://www.ifixit.com/Guide/Repair/Installing-iPad-2-GSM-Wi-Fi-Antenna/6166/1>

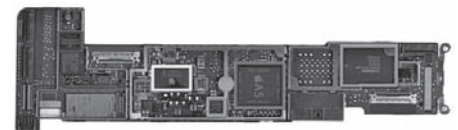


- Carefully rotate the front panel away from the iPad, being sure that no adhesive is still attaching the two components.
- Do not put excessive strain on the digitizer cable.
- Lay the front panel next to the rest of the iPad 2.
- Do not attempt to completely remove the front panel assembly just yet, as it is still attached to the logic board via the display ribbon cable.

- Remove the four 2.0 mm Phillips screws securing the LCD to the rear case.



- Lift the LCD from its long edge closest to the volume buttons and rotate it out of the rear case.
- Detailed step-by-step instructions to continue with disassembly of the iPad can be found at: <http://www.ifixit.com/Guide/Repair/Installing-iPad-2-GSM-Wi-Fi-Antenna/6166/1>

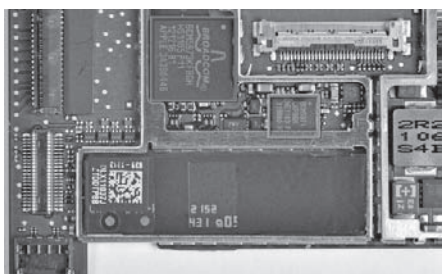


Notable chips found on the main CPU logic board:

- Apple 1GHz A5 dual-core Processor with a 200MHz bus and 512 MB of Samsung manufactured RAM.
- Toshiba TH58NVG7D2FLA89 16GB NAND Flash
- Apple 343S0542 – this looks like the Dialog Semi power management chip found in last year's iPad – all of those inductors and capacitors surrounding it are a clue.
- Texas Instruments CD3240B0 11AZ4JT G1 touchscreen line driver, working with the Broadcom BCM5973 and BCM5974 chips shown above.
- S6T2MLC N33C50V Power Management IC
- The A5 processor has manufacture dates of late January and mid-February 2011. Production was clearly ramping up through the last

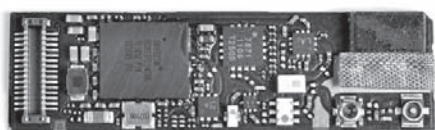
minute. It looks like the A5 processor is the APL0498, replacing the A4/APL0398 seen in the iPad 1 and iPhones.

- Apple-branded 338S0940 A0BZ1101 SGP. This looks like the Cirrus audio codec Chipworks found in the Verizon iPhone, but you'll have to get it off the board to make sure.



After popping off a few EMI shields, we get a good look at the ICs on the touchscreen logic board. They include:

- Broadcom BCM5973KFBGH Microcontroller used for touchscreen
- Broadcom BCM5974 CKFBGH capacitive touchscreen controller
- This is the same combination as the original iPad – nothing new here!
- Interestingly, the Wi-Fi board is attached to the logic board under one of the EMI shields. It can be easily pried off its socket.



- The Wi-Fi board; powered by another Broadcom chip, a

BCM43291HKUBC. Broadcom has made this Wi-Fi/Bluetooth/FM tuner combo chip a ubiquitous part for smartphones – lots of design wins.

- This is the same part Apple used in both the first iPad and the iPhone 4.



The 0.7MP rear-facing camera can shoot 720p HD video at 30 frame/s and has a 5x digital zoom. It shoots digital stills in a 4:3 full-screen aspect ratio. Video is captured in 16:9 widescreen to match the 720p standard, although only the central 4:3 part of the recording is shown on the screen during recording.



The front-facing camera assembly includes the camera, headphone jack, and microphone. The 0.3MP front camera shoots VGA-quality 30 frame/s video and VGA-quality still photos.



iPad 2 Repairability Score: 4 out of 10 (10 is easiest to repair):

- The LCD is really easy to remove once the front panel is gone.
- Only standard Phillips screws were used – no Pentalobular or Tri-Wing funny-business.
- The front panel is now glued to the rest of the device, greatly increasing the chances of cracking the glass when trying to remove it.
- The LCD has foam sticky tape adhering it to the front panel, increasing chances of it being shattered during disassembly.
- The battery is very securely stuck down to rear case, and you have to remove the logic board to remove it.

You can't access the front panel's connector until you remove the LCD.

SMART GRID ROUND-UP

Introduction

Smart grid is another strategic topic with IEEE. Our president has asked me to take over the role of CE Society liaison with IEEE Smart-Grid and I've been following various IEEE activities over the past couple of

months. I've also formed and convened a working group within CE Society to develop a strategy for working with IEEE Smart Grid and trying to understand where our Society can fit into and contribute to the larger IEEE initiatives and activities on Smart-Grid.

This issue I am featuring members of our *smart-grid committee*, their research and professional backgrounds and their interests in smart-grid. If you wish to bring matters relating to smart-grid to this working-groups attention please contact myself in the first instance.

A reprint of a short article, reproduced from the *IEEE Smart Grid Newsletter*, follows this. It is entitled *What the Internet of Things Will Mean for the Smart Grid* and should be of direct interest to CE Society readers. In future issues I will continue to select and republish a number of older articles from IEEE Smart Grid Newsletter to give our members and readers further insights into CE related aspects of the Smart Grid. If you want to subscribe directly you can do so at <http://smartgrid.ieee.org> and you'll receive an e-mail version of the Smart-Grid newsletter every month in your inbox.

Note that I am looking for a volunteer to run our *Smart Grid Round-Up* for the new CE Magazine. Establishing yourself as a regular feature editor on the IEEE Consumer Electronics Magazine can't be bad for your resume either. Contact me at ces-magazine@ieee.org if you are interested.

CE Society Smart Grid Committee



Brian Markwalter is Senior Vice President of Research and Standards for the Consumer Electronics Association (CEA), a trade association with approximately 2000 members representing the \$180 billion U.S.

consumer technology industry. Mr. Markwalter is responsible for overseeing CEA's ANSI-accredited standards development operation and extensive market research capability. Mr. Markwalter represents CEA's technical interests in industry and international venues related to digital television, broadband access, spectrum management, standards and intellectual property, smart grid and energy efficiency. His leadership in the industry is reflected through positions on the ATSC Board of Directors, IEEE Consumer Electronics Society Administrative Committee, NTIA's Online Safety and Technology Working Group, FCC's Technological Advisory Council, FCC's Video Programming Accessibility Advisory Committee and NIST's Smart Grid Interoperability Panel Governing Board.

Prior to joining CEA, Mr. Markwalter worked as Director at Intellon Corporation, a semiconductor company specializing in power line communications. In this

role, he helped develop and launch the technology adopted by the HomePlug Powerline Alliance for data networking over residential power lines and holds several patents in this area. Mr. Markwalter holds BS and MS EE degrees from the Georgia Institute of Technology and is a licensed professional engineer.



Farzin Aghdasi received a BSc in Electrical Engineering from Imperial College, London, an MBA from the University of Portland, Oregon, and a PhD in Electrical Engineering from the University of British Columbia,

Vancouver, BC, Canada. He has published over 50 papers in refereed journals and conference proceedings in areas related to image processing and multimedia communication. After more than 17 years in academia he moved to industry and has designed and shipped appliances for video capture, streaming, storage and display systems that are commercially successful.

He is now with Schneider Electric where he leads a team for developing systems intelligence for automated buildings management systems. In addition to security applications there are operational and energy management applications for these systems. These integrate with smart grid and energy management offerings across the breadth of Schneider Electric products and services from Square D and APC brands and for use in both homes and commercial buildings. Dr. Aghdasi holds a number of patents related to smart systems. He is also the project lead for IEC global standardization efforts for IP Video transmission protocols related to alarm systems.



Dr. Yu Yuan is a Research Staff Member at IBM Research - China, and is a veteran researcher in areas of Vehicular Technology, Intelligent Transportation Systems, Consumer Electronics, and IOT (Internet of

Things). Currently he is leading the research on Connected Vehicles and Mobility Internet in IBM China. Meanwhile, he is advocating IBM IOT Technology Center, which is a collaborative innovation platform for IOT research and development with industry and academia partners. An aspect of his work is to promote the commercialization of cutting-edge technologies in Electric Vehicle and Smart Grid. He has filed numerous patents and received many IBM Invention Achievement awards and IBM High Value Patent awards.

Dr. Yu Yuan has published extensively in referred conferences and journals, and has served on program/organizing committees of many major conferences including the 1st IEEE International Electric Vehicle Conference (IEVC 2012: <http://electricvehicle.ieee.org>). Dr. Yu Yuan is currently serving as the chair of IEEE Technical Committee on Software Infrastructure in IEEE ITS Society, the publicity chair of Land Transportation Division of IEEE Vehicular Technology Society, the vice chair of IEEE Vehicular Technology Society Beijing chapter, and the vice chair of IEEE Consumer Electronics Society Beijing chapter. Dr. Yu Yuan is a senior member of IEEE and a senior member of ACM.



Taikyeong Ted. Jeong received the M.S. and Ph.D. degree from the Department of Electrical and Computer Engineering, the University of Texas at Austin in 2000 and 2004, respectively. He performed research in the

area of analog circuits and power efficient system design techniques. Prof. Jeong is currently an Associate Professor at Myongji University; working on power management circuits for SmartGrid-related devices and ASIC design. His research interests include power management IC design, low-power design and SmartGrid application, for example, EV battery and charging system. He is a member of IEEE SSCS, CAS and CE.

For more information Visit URL: <http://asic.mju.ac.kr/>

As a member of SmartGrid committee, I am currently involved in energy saving consumer electronics design with an approach of low-power circuit design technique. For example, some analog circuits are required to design/implement for a Smart Meter or AMI, and also involved with power-aware devices - DMB, DAB, IPTV, etc. While CE products are connected with power source, a large number of CE products should save power consumption. An additional research topic for SmartGrid CE, such as a wired/wireless charging for Smart Meter and an energy-efficient SmartTV are also available.



Dr. Thanh Tran has over 25 years of experience in audio, video, computer, and communication systems design and is the CTO of DSP Systems New End Equipments at Texas Instruments (TI) Inc. At TI, he is leading a

team to develop reference designs, frameworks, and collaterals for the smart grid

and energy end equipment. He has held other senior design positions at Compaq Computer, Bose Corporation, and Zenith Electronics Corporation.

Tran holds 22 issued patents and has published one book, High Speed DSP and Analog System Design, and over 20 contributed articles. He is a Senior IEEE member and currently serves on the IEEE International Conference on Consumer Electronics Technical Program Committee and the University of Illinois at Urbana-Champaign ECE Alumni Board of Directors. He is also an adjunct faculty member at Rice University where he is teaching digital/analog audio, video and embedded systems design.

Tran received a BSEE degree from the University of Illinois at Urbana-Champaign, Illinois in 1984, and Master of Science and Ph.D. in Electrical Engineering degrees from the University of Houston, Houston, Texas in 1995 and 2001 respectively.



Dr. Peter Corcoran, IEEE Fellow; more than 150 technical publications, 40+ peer reviewed journal papers, 70+ International peer reviewed conference papers; co-inventor on 80+ granted US patents, 20+ granted

European, with another 80+ patents currently pending. University Professor for 24 years; member IEEE Consumer Electronics Society 15 years. Completed 20+ funded research projects and been directly involved in managing 2M in research funding over the last 5 years.

Currently Vice-Dean of Research & Graduate Studies in the College of Engineering & Informatics at National University of Ireland Galway. Current research interests include (i) repeatable biometric encryption keys; (ii) 2D affine face models for determining expression and emotion; (iii) smart grid & associated networking issues; (iv) digital imaging, including stereo imaging; Co-Founder of several start-up companies including FotoNation which is now are the core of the smart-imaging division of Tessera Inc – www.tessera.com. Industry consultant & expert witness. Peter's research interest in *smart-grid* goes back to the mid-1990's when he executed and published research based on powerline networking using the CEBus standard and in collaboration with US and Norwegian partners.



Dr. Ben Potter is a researcher in smart energy management with a current focus on agent-based control of energy flow in the smart grid. Ben completed his MEng degree in Engineering

Science at the University of Oxford in 2001 and his PhD research in the modeling of induction machines at the University of Reading in 2005. He has six years academic and industrial experience in power electronics, electric machines and wireless power transfer, and worked as the Research & Development Manager at Moog Components Group Ltd. before joining the University of Reading as a Lecturer in 2009. Ben is a member of the IEEE and CE Society.

Dr Potter is currently supervising five PhD students working on smart energy management, with two working directly on smart-grid applications. Ben's research is part funded and supported through a partnership with Scottish and Southern Energy, one of the UK's largest energy companies, and joint work is underway on smart-grid trials. The University of Reading brings together energy-focused researchers from Systems Engineering, Mathematics, Meteorology and Construction Management, resulting in a somewhat unique and beneficial mix of technical and socio-economic perspectives on smart-grid research.



Mr. Dukes is President & CEO of IU, LLC., a strategic management group that advises companies in development and investment of existing and new technologies, in particular high speed data systems, integrated

voice, data and video systems, interactive television and video on demand systems.

Mr. Dukes serves or has served on several public and private corporate boards and a number of technical advisory boards. He was Vice President, Digital Broadband Technology at MediaOne responsible for broadband development and member of CableLabs' DOCSIS Certification Board. He was Vice President, Technology with TCI, including network architecture, digital set-top and conditional access system requirements and developments. He was CEO of MCNS Holdings, responsible for management of the DOCSIS specifications for data over cable networks and cable modem development with over 130M cable modems deployed to the standard. He was Vice President, Advanced Network Development at CableLabs responsible for network architecture with \$85B in cable infrastructure deployed, multimedia, wired telephony and wireless PCS.

IEEE Fellow (2002); IEEE member since 1976; 2007-08 Chair of IEEE Masaru Ibuka Award Committee, 2010-12 President of IEEE Consumer Electronics Society. He is also co-author of "Breaking the Access Barrier: Delivering Internet Connections over Cable," John Wiley & Son, along with 19 other publications.



T. M. Coughlin, the founder of Coughlin Associates has over 30 years of magnetic recording engineering and engineering management experience at companies developing flexible tapes and floppy disc storage

as well as rigid disks at such companies as Polaroid, Seagate Technology, Maxtor, Micropolis, Nashua Computer Products, Ampex and SyQuest. He has an extensive engineering background in magnetic heads and media as well as integration of these and other technologies into hard disk drives. He was responsible as an individual contributor as well as a high level engineering and corporate manager for design of magnetic storage systems for many generations of hard disk drives at Ampex, Syquest, Seagate, Maxtor and Micropolis.

More recently Tom has become an evangelist for digital storage in consumer systems and applications. He is the author of **Digital Storage in Consumer Electronics**, published in 2008 by a division of Elsevier. He is the chairman and organizer of the annual **Storage Visions and Creative Storage Conferences**, well known in the data storage and storage applications industries. He has authored several key white papers and published over 70 articles, reports, technical papers and presentations. He is a senior member of the IEEE, a member of the Administrative Committee for the IEEE Consumer Electronics Society, and is currently chairman of the 2011 IEEE Sections Congress in San Francisco.



William Lumpkins, Senior Member of IEEE, is VP of Engineering at O&S Services where he manages a cross-functional team developing state-of-art Consumer Electronic products. His is also the Director of

Engineering at Pragmatics Technology Inc., a Semiconductor Test Engineering & Integration company. He was a senior staff member in the hardware division of Texas Instruments and served also as Director of Engineering with responsibility to expand their IP portfolio. He has a classical electrical engineering and computer science background from New York University & Maryland University College Park.

William founded the IEEE Dallas Section's Consumer Electronics Chapter in 2004 (www.dallasces.org) and serves on the Consumer Electronics Societies Administrative Committee and is also a past-president of the society. He currently *continued on page 42*

WHAT THE INTERNET OF THINGS WILL MEAN FOR THE SMART GRID

Editor's Note: This article was originally published in the June edition of IEEE smartgrid newsletter – <http://smartgrid.ieee.org/101-Smart-Grid-Newsletter/121-June-2011>



Dominique Guinard is a researcher at the Institute for Pervasive Computing of ETH Zurich. Previously, he was research associate for SAP Research Zurich, working

on using SOAs to connect smart things with business applications, and a visiting researcher at the MIT Auto-ID Labs. In 2007, he co-founded the WebofThings.com initiative with the aim of reflecting on how to use the Web to create a global grid of interconnected, everyday objects and machines.

Inter-communicating devices and integrated Web-based services will open exciting opportunities. Smart appliances in smarter buildings will be linked in grids that can be more tightly monitored and regulated in real time. New communications protocols and software applications of fundamental importance are showing the way.

Over the last several years, we have witnessed two major trends in the world of embedded devices. First, hardware is becoming smaller, cheaper and more powerful, so that many devices will soon have communication and computation capabilities. Objects will be able to connect, interact and cooperate with other objects in their surrounding environment and with control centers—a vision generally dubbed the Internet of Things (IoT).

Second, the software industry is moving towards service-oriented integration technologies; especially in the business software domain, complex applications based on combined and collaborative services have been appearing. The Internet of Services (IoS) vision projects such integration on a large scale: services

will reside in different layers of an enterprise; for example, in different operational units, IT networks or even run directly on devices and machines within a company.

As both of these trends are not domain-specific but common to multiple industries, we are facing a trend where the service-based information systems blur the border between the physical and virtual worlds, providing a fertile ground for a new breed of real-world aware applications.

What does this have to do with the smart grid? Thanks to real-world services, home appliances increasingly have ways to make their energy consumption known to their users¹, raising consumers' energy awareness. Furthermore, appliances can increasingly communicate with each other to make whole buildings smarter by optimizing heating, ventilating and air conditioning systems (HVAC), among other things.

Even more importantly, through composite applications using real-world services, industrial machinery and city-wide infrastructures will be manageable remotely to negotiate energy consumption and shave consumption peaks.

To facilitate these connections, research and industry have come up with a number of low-power network protocols such as Zigbee and Bluetooth and, more recently, IPv6, in a version optimized for resource-constrained devices called 6lowpan².

Although they are increasingly part of our world, embedded devices still form multiple, small and incompatible islands at the application layer; developing appli-

¹Weiss, M., Guinard, D.; Increasing energy awareness through web-enabled power outlets. In Proceedings of the 9th International Conference on Mobile and Ubiquitous Multimedia (MUM '10). ACM, New York, 2010. <http://doi.acm.org/10.1145/1899475.1899495>

²<http://ipso-alliance.org/wp-content/uploads/6lowpan.pdf>

cations to take advantage of them remains a very challenging task that requires expert knowledge of each platform. To ease the task, recent research initiatives have tried to provide uniform interfaces that create a loosely coupled ecosystem of services for smart things. The goal is to create a real-world grid in which smart things provide services that can be easily combined to create new applications, an eco-system increasingly more ready to implement some of the big visions of smart grids.

Two types of service-oriented architectures stand out as potential candidates to enable uniform interfaces to smart objects: the Representational State Transfer (REST) and WS-* Web services.

WS-* services declare their functionality and interfaces in a Web Services Description Language (WSDL) file. Client request and service response objects are encapsulated using the Simple Object Access Protocol (SOAP) and transmitted over the network, usually using the HTTP protocol. Further WS-* standards define concepts such as addressing, security and discovery. Although WS-* was initially created to achieve interoperability of enterprise applications, work has been done to adapt it to the needs of resource-constrained devices. Lighter forms of WS-* services, such as the Devices Profile for Web Services³ (DPWS), are targeted towards IoT applications.

At the core of a RESTful architecture lie resources that are uniquely identified through Uniform Resource Identifiers (URIs). The Web is an implementation of RESTful principles; it uses URLs to identify resources and HTTP as their service interface. Resources can have several representation formats (HTML, JSON, and so on) negotiated at run-time

³<http://www.ws4d.org/>

using HTTP content negotiation. In a typical REST request, the client discovers the URL of a service it wants to call by browsing or parsing and following links in its HTML representation. The client then sends an HTTP call to this URL with a given command (such as GET, POST or PUT), a number of options (i.e. “accepted format”) and a payload in the negotiated format (such as XML or JSON). Several recent research projects implement RESTful Web services for smart things⁴, also known as “Web of Things” projects⁵.

Both approaches have advantages and disadvantages. Generally, WS-* services are preferred when advanced security features are desirable, whereas RESTful services—thanks to their ease of use and light weight – studied in the IoT context by Yazar and Dunkels⁶—better fit resource-constrained devices and foster public innovation.

As the vision of an IoT is slowly materializing thanks to SOAs, researchers are busy solving some of the challenges that have been surfacing: How can the Internet and Web protocols be optimized to fit the needs

of resource-constrained devices? When considering billions of things connected to the Web or the Internet, how do you identify the services that let you, for instance, negotiate the energy consumption of a smart thing? Furthermore, if billions of smart things are on the Web, how do you manage and control access to their services?

These are but a few of the questions on which researchers will have to focus to implement a global and interoperable network of everyday devices that will support some of the most challenging use-cases of smart grids.

⁴Drytkiewicz, W.; Radusch, I.; Arbanowski, S.; Popescu-Zeletin, R.; “pREST: a REST-based protocol for pervasive systems,” Mobile Ad-hoc and Sensor Systems, 2004 IEEE International Conference on , vol., no., pp. 340–348, 25–27 Oct. 2004 <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1392173&isnumber=30305>

⁵Guinard, D.; Trifa, V.; Wilde, E.; “A resource oriented architecture for the Web of Things,” Inter-

net of Things (IOT), 2010, vol., no., pp. 1–8, Dec. 1 2010 URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5678452&isnumber=5677827>

⁶Yazar D., Dunkels, A. Efficient application integration in IP-based sensor networks. In Proceedings of the First ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings (BuildSys

’09). ACM, New York 2009. <http://doi.acm.org/10.1145/1810279.1810289>

Smart Grid Round-Up *continued from page 40*

is chair of CE Society’s standards activities and society liaison with IEEE Standards.



Professor Tomohiro Hase was born in 1953 in Gifu, Japan. He received a B.S. degree from the Fukui University, and M.S. and Ph.D. degrees from the Shizuoka University, Japan. All degrees were in Electronic

Engineering, and were received in 1977, 1979 and 1995. In 1979, he joined Mitsubi-

shi Electric Corporation, and engaged in research into signal processing for audio visual equipment and microprocessor applications. He has been a professor of the Faculty of Science and Technology of Ryukoku University, Japan since 2002. He is teaching and researching into information and communication technology for audio visual appliances, and human interaction technology for mobile devices. He has published more than 100 papers include 19 papers for IEEE Transactions on Consumer Electronics, and more than 40 papers for ICCE, ISCE and GIC. He

has 15 Japan patents of Consumer Electronics use.

His contribution for Consumer Electronics Society. He founded the CE Kansai Chapter on January 2009 and was first Chapter Chair. He was a General Chair of the ISCE2009 on May 2009 at Kyoto, Japan. He is a Vice President, International Strategy, on 2011. He will be a General Chair of the GCCE2012, new International Conference sponsored by CE society, on October 2012 at Tokyo, Japan.

He’d like to contribute to the IEEE Consumer Electronics Society continuously as one of the administrative committee.



IEEE CE SOCIETY STANDARDS UPDATE

William Lumpkins,
Sr. Member IEEE,
IEEE CE Society Standards Committee Chair,
Wi2Wi Inc.

The fall season is upon us, the Smart Grid power system in the United States is being taxed by the sweltering heat wave here in Texas and the rest of the southern part of the United States. My friends in Asia, tell me to stop whining as they are used to weekly brown-outs. I suppose I am a wimpy American. But I like complaining, I can't wait for Smart Grid technology and solar technology to take the next step of implementation so I can run my air conditioner at full blast and pretend that I live in Alaska during our summer months.

As you can see below some of the new standards out this month are taking advantage of the opening of the "White Space"¹ frequency regions that are left vacant due to analog/analog television moving into the Digital frequency space (54 MHz and 806 MHz (54–72, 76–88, 174–216, 470–608, and 614–806)¹² television frequencies (Channels 2–69), ceased operating on June 12, 2009 per a United States digital switchover mandate). Economic/politics aside this should be a burgeoning new space that will allow a lot of new consumer based applications to open up. Already I see Texas Instruments, Broadcom, Marvel, Intel and others investing heavily in the White Space field by rolling out ASIC's and mainstream processors with Digital FM and White Space radios. As always these technologies take a while before they show up in consumer products (five to ten years) but expect to see them soon at CEA's CES show in the next year or two.

Another burgeoning standard for determining SAR (Specific Absorption Rate), SAR is well known by Cell Phone manufacturers as the

Radio Frequency strength that is allowed by the FCC or European Union or (pick your country's EMC/EMI compliance body) to enter your head (or brain). It is a topic most folks do not like to talk about. As I tell students during my frequent lectures to Universities that I visit, I ask the students "What frequency is the best to heat water molecules?" There would be blank stares, I would reply, "Well, it is a microwave frequency with a wavelength of 12.2 cm which oscillates at 2.45 GHz". I would then ask, "What is your brain mostly filled with?" A few less blank stares, a few snide comments, someone would say, "Water". I would then ask, "What frequency does your Wi-Fi, Blue Tooth Head, or Cell Phone operate at?" There is always a long pause. Then Students state quietly with a sense of dread "2.4 GHz". Everyone that deals with SAR knows that it is bad to have too much energy that can heat the water molecules in our brain and other parts of the body (Sorry, guys, maybe you shouldn't operate that Wi-Fi device in your lap, unless you already have a gaggle of kids.) Hopefully, these new SAR standards can help us with the safely implementation of this frequency that won't be going away any time soon.

Lastly, the IEEE Standards Association is trying a new approach to reach out to audiences that it normally does not reach, to this end it has created some nifty videos on the Smart Grid Initiative for Chinese speakers with some new videos. If you speak Chinese or are hoping to learn, take a look at the videos below. We at the IEEE CE Society hope this is helpful and appreciate any comments/or criti-

cism that you can send our way on this column. xillia@ieee.org (Will Lumpkins)

IEEE New Projects

IEEE 802.22™-2011 Standard for Wireless Regional Area Networks in TV Whitespaces Completed

IEEE announced that it has published the IEEE 802.22™ standard. IEEE 802.22 systems will provide broadband access to wide regional areas around the world and bring reliable and secure high-speed communications to under-served and un-served communities.

IEEE 802.22 incorporates advanced cognitive radio capabilities including dynamic spectrum access, incumbent database access, accurate geo-location techniques, spectrum sensing, regulatory domain dependent policies, spectrum etiquette, and coexistence for optimal use of the available spectrum.

The IEEE 802.22 Working Group started its work following the Notice of Inquiry issued by the United States Federal Communications Commission on unlicensed operation in the TV broadcast bands

To view the complete article, please visit: <http://ieeestandards.org/ct.html?rtr=on&s=8nv,ljw8t,340i,jy2u,73kc,8017,fo6j>

IEEE Approves Projects to Create Standards for Methods of Determining Specific Absorption Rate (SAR) in Users of Wireless Communications Devices.

Three new IEEE standard projects will address making spatial-peak SAR calculations for humans exposed to vehicle-mounted antennas and mobile phones.

The IEEE Standards Association (IEEE-SA) Standards Board has approved projects for the creation of three standards for using the Finite Difference Time Domain (FDTD) technique in determining the peak spatial average Specific Absorption Rate (SAR) in people from wireless communications devices. The benefits include standardized and accepted protocols and standardized anatomical models, validation techniques, benchmark data, reporting format and means for estimating the overall uncertainty in order to produce valid and repeatable and reproducible data. The projects are:

IEEE P62704-1™ – Standard for Determining the Peak Spatial Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices, 30 MHz–6 GHz. Part 1: General Requirements

for using the Finite Difference Time Domain (FDTD) Method for SAR Calculations.

IEEE P62704-2™ – Standard for Determining the Peak Spatial Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices, 30 MHz–6 GHz. Part 2: Specific Requirements for Finite Difference Time Domain (FDTD) Modeling of Vehicle Mounted Antenna Configurations.

IEEE P62704-3™ – Standard for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices, 30 MHz–6 GHz. Part 3: Specific Requirements for Finite Difference Time Domain (FDTD) Modeling of Mobile Phones/Personal Wireless Devices

New Smart Grid Videos Available (In Chinese)

The IEEE and the IEEE Standards Association (IEEE-SA) continue to develop their activities in the Smart Grid area in China. Three new videos (below) provide an update on IEEE and IEEE-SA latest initiatives.

<http://ieeestandards.org/ct.html?rtr=on&s=8nv,1jw8t,340i,ehvu,hzuf,8017,fo6j>

<http://ieeestandards.org/ct.html?rtr=on&s=8nv,1jw8t,340i,c92z,6m82,8017,fo6j>

<http://ieeestandards.org/ct.html?rtr=on&s=8nv,1jw8t,340i,5qo2,j3yk,8017,fo6j>

For Questions about joining any of the above standards, please contact Will Lumpkins at xillia@ieee.org
CE Society Standards Chair

Citations

[http://en.wikipedia.org/wiki/White_spaces_\(radio\)](http://en.wikipedia.org/wiki/White_spaces_(radio))

CONFERENCE REPORT – ISCE 2011

Nicholas Vun ISCE2011 General Chair
Stefan Mozar IEEE CE Soc VP Conferences

The IEEE Symposium on Consumer Electronics (ISCE2011) was a very successful event. This year it was held in Singapore from 14–17 June 2011. It was a special event as it marked a major milestone in the history of the symposium. It was the 15th anniversary of the ISCE. It has been held annually since 1997. The “home” of the ISCE is Singapore. It was the then newly formed Singapore Chapter that initiated this symposium. That is why Singapore was voted to host the symposium during its 15th anniversary. This year’s General Chair, Nicholas Vun, was also the very first ISCE chair! Nicholas brought together an outstanding team that very efficiently managed the symposium. The conference was centrally located and close to Singapore’s famous Orchard Road, which is best known for its shopping.

The ISCE has grown to be a global conference, which alternates between Asia and the rest of the world. It is a major annual event in the consumer electronics calendar. The international make up of the attendees reflects the global acceptance of this symposium.

ISCE 2011 scheduled 24 sessions of presentations by delegates from the industry, academia as well as research communities from over 20 countries. It featured three very interesting keynote presentations and a tutorial over the 4 days. All of these were very well received and had a great turnout. Tom Coughlin started off with his keynote presentation on Digital Storage for consumer applications on the first day. On the second day, Izhak Baharav of Corning West Technology Center delivered a keynote on Touch Screen

Technologies, completed with a very imaginative and futuristic video on how glass technology could be used in our daily life in the near future. On the third day, Elya Joffe, President Elect of IEEE Product Safety Engineering Society, presented a keynote topic on the potential conflicting requirements between EMC and Safety in CE product design. This was then followed up in greater detail in his tutorial on the topic of Grounding for EMC design on the fourth day morning. This tutorial had many participants from local consumer electronic design centers.

The Singapore Organizing Committee and the CE Society were proud to have Mr Henn Tan accept the Engineering Leadership Award. This award was presented during the conference opening ceremony. Mr Henn Tan is the CEO and Chairman of Trek



Engineering Leadership Award Recipient Mr. Tan, Henn.



Best Paper Award Recipient Prof Wen-Chung Kao (center) to his left is CE Soc President Steve Dukes and to his right VP Conferences, Stefan Mozar; next to the right is Nicholas Vun.



Conference Dinner

2000 International Ltd, a Singapore based company that was a pioneer in the development of the USB memory stick, and holds the worldwide trademark: ThumbDrive. His contributions toward the memory stick make him a very worthy recipient of this prestigious award. During the ceremony his company, Trek 2000, gave a technical presentation on their latest innovation, the FluCard technology. This was followed by a live demo during

the tea break. This presentation was extremely well received by the delegates.

ISCE2011 also arranged two sessions for judges to select the best paper awards. Our IEEE CE Society President, Steve Dukes, took time off from his busy schedule and arrived in time to present the awards to the winner.

The overall turn out for ISCE2011 was very good, and the fact that

most of the paper presenters turned up demonstrates the quality of the technical sessions. The number of no-shows was very low.

One of the highlights of the conference was undoubtedly the conference dinner. Apart from the amazing multi course Chinese dinner, the organizing committee arranged for an interesting program. During the dinner Aldo Morales the ISCE2012 chair invited all attendees to participate in the Harrisburg, Pennsylvania Symposium. The team that will host the ISCE2013 in Taiwan also invited delegates to participate in Taiwan.

The ISCE is now an established meeting place for consumer electronic professionals to get together and share ideas and catch up with friends. Next year the ISCE2012 will be held in the United States. The hosts are the Susquehanna Section and it is cosponsored by the CE Society. The General Chairs are Aldo Morales and Sedlig Agil, who invite you to plan ahead and make sure that you don't miss out on the opportunity to participate in this great conference. Aldo mentioned that in Harrisburg there is a chocolate ending! A visit to the Hershey factory is on the agenda.

IEEE Consumer Electronics Magazine

Call for Articles – Spring Issue 2012

Next Generation Television (NGTV)

Associate Editor: *TBD (Peter Corcoran, for now)*

Television of one form or another has been at the core of Consumer Electronics since its widespread adoption for home entertainment in the 1950s. The original evolution of Television was a slow one taking many decades for color TV to become affordable and gradually replace monochrome TV during the 1970s & 1980s. Analog broadcast and cable networks converted to digital technology and adopted HDTV standards during the early 2000s.

In recent years we have seen the re-invention of TV with higher definition images – HDTV – and improved cinema-like sound quality. Analog broadcasting is a thing of the past and today the underlying technology is entirely digital ensuring high picture quality. Connectivity has also been greatly improved with the adoption of HDMI standards for A/V interfaces.

Now Television stands at a new cross-roads. What strategic direction will it take? Higher definition or 3D images? More audience interactivity? Merge with or fight the Internet? Only you know the answer – please share with our readers!

Articles should be broadly scoped – typically review and tutorial articles are particularly suited to the CE Magazine. Technical articles may be suitable but these should be of general interest to an engineering audience and of a broader scope than regular technical papers for archival journals.

Suitable topics include:

Ultra-HD Television – Broadcast Standards	3D Television Technology – Codecs & Broadcast Standards	3D TV Technology – Displays & Projection Systems
Ultra-HD Television – Display Technologies	Interactive Television – Technologies & Case Studies	Television & the Internet – Managing & Securing Content
IPTV – Current Status and Future Trends	Cable Networks & TV – New Directions & Technologies	Television & the Internet – Leveraging the Long-Tail
HDTV in Japan – History and Current Trends	Digital Broadcasting – Today’s Tech. & Tomorrow’s Challenges	Connectivity Challenges for NGTV

Articles related to practical testing and evaluations of state-of-art next-generation technology systems are particularly welcome. While some emphasis on the CE related aspects of these systems is required, articles dealing with interdisciplinary aspects of NGTV are welcome. Tutorials on CE related technologies or techniques related to HCWM are also encouraged.

Interested in contributing? Please contact the editor at cesmagazine@ieee.org for feedback and to discuss the suitability of your ideas for an article.

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Save the Date!
ICCE 2012

30th IEEE Conference on Consumer Electronics
January 13-16, 2012 Las Vegas



Mark Your Calendars!
IGIC 2011

3rd IEEE International Games Innovation Conference
November 2-4, 2011 Orange, CA USA