

**From:** Steve Stanzel  
**Sent:** Tuesday, January 26, 1999 7:57 PM  
**To:** Don Hardwick  
**Subject:** Windows 98 strategy

Don - I'm dumping on you a bit now. You don't need to study these but you may want to glance at them. If Richard Fade is meeting with David Cole today then he has better information than we do. Maybe that's part of the issue but I believe this resurgence will require some efforts from our team, not FTE but definitely some time.



FW: Hardware  
Requirements & Tr...



FW: latest slides for  
BILLG/St...



FW: win98 osr  
marketing push



FW: Win98 refresh: the  
plan

Plaintiff's Exhibit

9140

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**From:** Kim Akers (Windows)  
**Sent:** Tuesday, January 26, 1999 5:37 PM  
**To:** Steve Stanzel  
**Subject:** FW: Hardware Requirements & Trends Slides

-----Original Message-----

**From:** Carl Stork (Exchange)  
**Sent:** Monday, January 25, 1999 5:50 PM  
**To:** Chris Jones; Craig Mundie; Jay Torborg; Deborah Black; Bill Veghte; George Moore; Julian Jiggins; Megan Bliss; Curt Smith; Cristiano Pierry; [cphillips@microsoft.com](mailto:cphillips@microsoft.com); David Alles; Joe Belfiore; Kim Akers (Windows); Lora Shiner; Future of Windows Group #2; Christian Fortini; Lora Shiner; David Cole; Carl Stork's leads; Ed Stubbs  
**Subject:** Hardware Requirements & Trends Slides

Here are the slides that I presented today.



Carls-Consum-HW.ppt

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## Consumer Windows Offsite Hardware Requirements & Trends

- Microsoft Hardware Initiatives
- Industry Core Hardware Needs
- Additional Hardware Trends
- OEM requests for 1-3 years
- Intel request for 1999
- OS Competitors

## Microsoft Hardware Initiatives

- USB Improvements
- OnNow Improvements
- Legacy Free Architecture
- Digital Media
- High Speed External Buses
- Home Networking & Internet Connection Sharing
- Digital Entertainment

# USB Improvements

## Why?

- User benefits in usability, ease, simplicity
- Shortcomings in present USB support

## What is needed?

- Utilities to help users with topology, status
- Microsoft support for more devices - printers, communication (cable modem, DSL, ISDN), storage (floppy), mappers for LPT, COM
- Resource management - bandwidth, power, CPU

## Future

- High Speed USB

## OnNow Improvements

### Why?

- Users want appliance “instant on” operation
- PCs shared on network, need to wake up when needed
- System boot time too long
- Reliability & pervasiveness of suspend/resume & OnNow inadequate

### What is needed?

- High reliability
- Net resources & connections automatically available
- USB wakeup
- ACPI Hibernate
- ACPI advances
- Broaden device class & device driver support

# Legacy Free Architecture

## Why?

- Reduce complexity for user
- Reduce cost for OEM
- OEMs & Intel want to use this to create new form factors, grab leadership from iMac

## What is needed?

- Add OS support to remove super I/O
  - Add USB to COM & LPT mapper
  - non-boot USB floppy
- Legacy-free boot (w/o super I/O)
- Hide MS-DOS
- Broader USB device classes

## Digital Media

### Why?

- Scanners, digital cameras, digital camcorders widespread
- PC role for editing
- Windows infrastructure incomplete

### What is needed?

- Drivers for devices
- External bus support (USB, 1394, IR?), Flash
- WDM 1.1 & DV
- Codecs & command/controls (e.g. AVC, 61883)
- Video Source Management
- Support for Writable CD/DVD formats
- Helping user manage myriad of image formats, including conversion
- Helping user manage content and publish



## Keys to Successful Consumer Scenarios

- Cheap, easy, permanent digital images
  - Picture CDs @ \$5 and fast
- Still and Motion
- Good cataloging support - Solve the shoebox problem
  - PC often a repository for images at end of scenario for image reuse/categorization
  - Removable media, prompts for CD insertion
  - Use several CDs in one session
  - Annotate and search capabilities
- Storage for digital camera pictures
  - Cheap storage that PC can read directly
  - Fast, convenient transmission from camera
- Sharing the pictures easily
  - Photo capable printer at the \$199 price point
  - Color fidelity and consistency from start to finish
  - Web posting and hosting easy
- Automatic image correction

## Problems Microsoft Must Solve

- Make image management transparent to user
- Bring all key devices together for capture, editing and publishing
- Internet and communications key to publishing
- Image Input
- Color
- Cataloging
- Search
- UI for Accessing Images
- Data Exchange
- Publishing and Sharing

These are the general areas that need improvement to make the PC #1 in creativity based on imaging technology

## High Speed External Buses

### Why?

- External buses offer usability benefits
- 1394 has some momentum in consumer electronics
- PC industry strategy in flux

### What is needed?

- Getting serious about 1394 & devices on 1394
- 1394 boot?
- Develop Microsoft strategy for high speed external buses
- Support for High Speed USB or other PC industry alternative

## Home Networking & Internet Connection Sharing

### Why?

- Majority of homes will have multiple PCs
- Drive Windows sales
- Permit easy, convenient networking and Internet sharing
- Strong OEM interest & third party development

### What is needed?

- Support for broadband (DSL, cable, ISDN) via various interfaces (incl USB)
- Support for variety of in home media - Ethernet, phone line, RF
- Internet connection sharing
- Transitory laptops (solve problems of login, different Internet proxy settings, VPN concurrent w/ other Internet use, etc.)
- File location transparency - independent of location

# Digital Entertainment

## Why?

- Windows enhancements to digital entertainment experience - see Pandora

## What is needed?

- DVD (recordable), digital broadcast, cable, satellite
- Digital audio, MP3, music management.
- A/V routing in home
- Universal PnP for consumer electronics AV
- Optical media jukebox
- Content management
- Trusted Windows, Digital rights management
- Distance UI

# Core Hardware Support

New Hardware in a Timely Fashion (not doing all of these)

## Short term for 1999:

- Ultra DMA 66
- Updated Chipset Support for Intel Whitney & Camino and other misc chipsets (Geyserville Support)
- ACPI Improvements for Hibernate, USB Wakeup
- Device Bay
- Home Networking & Internet Sharing
- WDM 1.1 for W98 to match NT5, support DV (Digital Video)
- More USB Classes
  - Printers, Comm (Cable Modem, DSL, ISDN), Storage (Floppy), Mappers for LPT, COM

*Updated Drivers*

*Additional Intel Items!*

## Invest in 1999 for growing market:

- Legacy-free Boot (No Dependencies on Super I/O)
- Writable DVD (Writable UDF Filesystem for DVD-RW And/or DVD-RAM)
- Updated 1394 Support, Including DV & 1394 Boot
- OS Resource Management (Bandwidth, Power, Processing). (Needed Today for USB, Later More Broadly As More Things Move Into Software, Also More Definable Latencies)
- Digital Media / Imaging & Audio
- Home Networking Usability, File System
- Trusted Windows

## Additional Hardware Trends

- Low Cost PC
- Digital video interfaces, flat panel displays
- Video switching
- Remote controls
- Network attached peripherals/appliances
  - Storage, printing, cameras, gateways, servers

## Low cost PC

- Full PC Hardware Has Reached \$400
  - eMachine @ \$399.00 w/o monitor
    - HW is solid, 266MHz CPU, 32M RAM, 2+G HD, CDROM, Audio, Modem
  - Infoworld, CRN & PC week report it as a "sell out", cannot confirm any numbers
  - Solid HW config, 266MHz, 32M, 2+ GHD, CDROM, Audio, Modem
- Trigem gets cost break on tariffs, labor and transportation costs
- Low cost trend will drive multi PC house holds and new PC upgrades - PC market will not stall
- Spiffs/rebates may continue to lower prices



## Digital Video Interfaces

- Digital video interface standardized
- LCD displays
- Large active flat panel displays
- Will enable higher quality, larger and more remote displays

## Video Switching

- Concept is that consumer wants to view or consume any in-home video stream (broadcast, cable, DVD, satellite, NetShow, game) in any physical room/display in the home
- Must address switching video, audio and input

## Remote Control

- Should MS establish and evangelize or standardize a lowest common denominator remote control?
- Style guide, minimum key set & behavior, standard OS support
- Couple with distance UI
- Can allow for extension/branding by OEM

## OEM Requests

- Better understanding from MS of OEM business model
  - OEMs looking for revenue from services / Internet
  - Communication and Predictability from MS on deliverables
  - Make it easier to manufacture a PC with Windows pre-installed
  - Offer ways for OEMs to differentiate their platforms
- Improvements to the PC/Windows combination
  - Change end user perception that PC is unstable / hard to use
  - Improve the user experience in setting up the PC for the first time
  - Improve the user experience when setting up any device or application
  - Improve the supportability of the PC, from user error messages to built in support tools - reduce support costs
  - Add functionality that benefits new usages
  - Must grow these over next 3-5 years

## OEMs

- **New opportunities in interest order**
  - ISP/Portal affinity, HomeNet & Internet sharing, Legacy Free, Imaging, UPnP / Networked Appliances, Digital Audio Distribution, 10 ft viewing (couch)
- **Platform Stability / Maturity**
  - First Boot, Reliability, Simplicity, supportability,
- **Understand their business needs**
  - Understand ship cycles, help in low cost, incremental revenue

## PCs That Are Connected Within the Home and to the Internet

- Sharing One Internet Connection
- Not Dependent on Internet Connection for Basic Functionality
- Idiot-proof Setup
  - Resources in the Home (Files, CDs, Printers, Etc.) Accessible Everywhere on the Net in a Transparent Way
  - Can Be PCs That Are Peers or Hydra-terminal Model
- Set up for Multiple Family Members. Share Apps. Private Data & Configuration
- Security, Esp. Over Internet

## Couch Vs. Desk PCs (Pandora will fit these needs)

- Today's PCs Designed for Desk Experience (2-feet)
- Provide UI for Couch Experience (10-feet)
- Consider UIs for PCs Specialized for Primary Functions (E.G. Message Center/telephony, Gaming, TV/entertainment, Etc.)

## Manufacturability

- Design Our OS Releases & Toolkits for the OEM Manufacturing Process
  - Incremental fixes that allow updating just the affected files & cabs, not create a whole new image
  - Frequent driver CAB updates so that new PCs ship with the latest drivers (Needed for real end user PnP)
  - Smart preinstalls - so that OEMs can use a single image for multiple motherboard/BIOS combos. Requires a lightweight pre-boot utility to do any tweaks for the actual motherboard/bios without needing hardware detection



## PCs That Boot Instantly (or Always On)

- Absolutely Reliable
- All Net Resources Available
- Net Connections Established Instantly

## Single OS or Transparent OS

- Don't Make Consumer Choose Between OS's
  - One current latest pervasive consumer OS
  - Transparent multi-language support
- For Retail Sales, Don't Want Different OS's on the Same Hardware or Providing Comparable Functions (Compaq only feedback)
- Must Be Simple to Sell/buy

## First Boot Experience

- Allow all OEMs flexibility to build Acer "like" PCs & beyond
  - Acer reports high satisfaction, no returns based on lack of COM or MSDOS support
- Shorten First Boot Experience to Minimum
- Get Users of All Skill Levels Running Properly - Provide Appropriate Education, Allow for OEM tutorial
- If We Provide Tutorial, Allow OEMs to Hook It to Add More Info
- Allow OEMs to Add Their Logo and Product Images
- Eliminate Reasons for Product Returns - Troubleshoot Problems & Educate Users. (50% of All Returns Happen Within 4 Days)
- Unified Registration Process & ISP Sign up Process

## Reliability & Simplicity

- Make It Impossible for Users or Third Party Providers (SW or HW) to Break the System
- If Something Is Broken, Then
  - (1) Let the Rest of the System Keep Functioning; (kill safe boot)
  - (2) Provide for an Automated Way to Fix the Problem
- Eliminate As Many Error Messages and Error Conditions As Possible - Don't Involve the Users
- Tie error message directly to trouble shooter - allow OEM to use this
- No Reboots Needed
- Fix Hardware & Driver Installation - the Order Things Are Done, Where It Looks for Infs and Cabs, Etc. Also Eliminate PnP Dialogs When Not Needed
- Instrument and Log Problems on End User Machines so that the Conditions That Gave Rise to Them Can Be Eliminated
- Make All the Microsoft Components Work Together - E.G. IE & OE; All the Cpls and Other Utilities
- Making Things Work Properly and Reliably Is More Important That UI Advances
- Fix Volume Control
- Only Allow Reliable Third Party Drivers And/or Allow Easily Backing Them Out

## Design for Supportability

- Design So Anything That Creates End User Calls Is Either Eliminated or All the Information Is Available to Efficiently Resolve the Problem
- Anywhere We Ask for Information - If It Can Be Done Automatically, Do It Automatically; Validate All Data or Restrict Choices to Only What Is Applicable
- Improve Dial Configuration & Dial up Networking - Way Too Complex. Add Troubleshooting
- Better ISP Flexibility - So That ISPs Don't Replace So Much of Our Dialogs/UI
- Support Costs Are Big Dollars for OEMs - Reducing and Shortening Calls Creates Real Value

## Plan for Retail OEM Ship Cycles

- Three Main Cycles: Back to School, Xmas Holiday, Spring Refresh
- Major New Functions & OS Introduced Only for Back to School
- Back to School: Want Software in February, Manufacturing Ramp Is in May
  - (note: OEMs don't start full testing until golden bits)
- Holiday: Want Software in May, Manufacturing Ramp in August
- Spring Refresh: Want Software in November, Manufacturing Ramp in Jan/Feb
- Direct OEMs (Dell, Micron, Gateway) Are Different
  - Compaq, IBM, HP want to emulate BTO model

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## Help From Microsoft in Supporting Low Cost Trend

- Can We Help Remove Additional Hardware Costs (Put More Functions in Software)?
- How Will We Support a Non-PC (Removing X86 And/or Disk)?
- How can we help OEMs sell higher margin PCs?
  - Applies across all segment
- Must drive support costs to zero

## Provide Opportunities to Earn Incremental Revenue

- Provide Organized Ways for OEMs to Earn Incremental Revenue
- From Things Like ISP Sign-up, Preferred Web Sites for Commerce, Searching, Portal, News, Pre-loaded Favorites
- MSN strategy for OEMs?



## Things that Intel wants Greatest Impact/ Intel Cannot Workaround

### Poor chance

- No requirement for keyboard controller at boot
- Katmai TCP/IP perf enhancements
- Audio
  - WDM Audio miniports
  - WDM PCI acceleration
  - HRTF 3D audio
  - Rate matching for WDM Audio
  - DirectX Audio team currently focused on Win2K & not Win98

### Won't have

- TAPI3.0
  - Our dev. not due for months
- Hot Plug IDE
  - Pulled because feature destabilized PnP
- S3 resume < 5s
  - It takes us 8s
- USB Comm. Class for broadband modems
  - Intel has not yet delivered us hardware as promised
- USB Storage Class Support
  - Spec & hw still moving targets
- Suspend to RAM
  - '00 due to stability
- Caller ID upon Wake On Ring
  - Intel has not yet delivered promised caller ID h/w

Backup slides

# Intel's Windows 98 BTS 1999 Features Requirements Update

## Summary - 1/6/99

✓ In current builds    **BOLD** = Issue of concern    ↑ Good progress    \*\* Key Base of Use feature  
 ↓ No real progress    ☐ Not supported/Not Complete    ? Support Unknown    # Details in separate doc

Impact	Cannot Workaround	Can Workaround
Greater	<ul style="list-style-type: none"> <li>↑ Processor update driver support for Celeron and Xeon, and from B3 review</li> <li>✓ KMI exceptions</li> <li>↑ Configuration apply for External processor serial number</li> <li>↓ Kernel-specific TCNDP performance enhancements</li> <li>↑ Support 64000/Channel Wh/Busy (including ADP4X and FastWm capabilities)</li> <li>✓ Signal issue bug fix to ACPI/Hostonly Available**</li> <li>✓ Support to RAM**</li> <li>☐ BK chipset error workaround for C3 state</li> <li>✓ Signal/irq bug fix to USB modem operations</li> <li>↑ Allowable OEMs to change various items via OPM** #</li> <li>✓ Device/IRQ mapping apply for LSI**</li> <li>↑ Support for S2 not resume from S3**</li> <li>↑ Remove requirement for keyboard controller at boot**</li> <li>↑ Remove requirement of Supply for system mechanisms/recovery**</li> <li>↑ USB UFD/CD Rom/Joystick performance (improve support PC software &amp; link out hardware)</li> <li>↑ USB device without serial # recognized if in different port**</li> <li>↑ Support for ALIC power budgeting for PCI and USB waking devices</li> <li>↑ USB remote client support for broadband systems</li> <li>↑ USB string class support</li> <li>↑ USB bandwidth management infrastructure at board**</li> <li>✓ VDM modem driver support</li> <li>↑ WDM audio adapters and Win2000 WDM audio files</li> <li>↑ WDM audio PCI acceleration support</li> <li>↓ Support for retaining other ID upon Wake on Ring</li> <li>✓ Automatically install part of WakeTV for Windows boot</li> <li>↑ MMX optimized EMUP 3D audio</li> <li>✓ Packet (Waking) Wake on LAN</li> <li>↑ Include FIV over ATM driver</li> <li>✓ ATAS: IDE driver update</li> <li>↑ NDIS 1.0 WDM class class with USB mini-drivers (including broadband modem support)</li> <li>↑ Hot plugging of IDE drive device for Duramix</li> <li>↑ Rate-matching mechanism for WDM audio</li> <li>☐ TAP2I port w/ E.20, E.22, pluggable AEC, pluggable A/V guides</li> </ul>	<ul style="list-style-type: none"> <li>✓ KMI enabled OSD</li> <li>↑ Highest performance IDE (new master default)</li> <li>↑ Drive support for OS for OEM-provided USB devices</li> <li>☐ ACPI support for Crysosville</li> <li>☐ 1994 A/V stack overhaul</li> <li>☐ DM3 provider (in WDM SDK)</li> <li>↑ CAP1 enhancements to support Seagate drive</li> </ul>
Lesser	<ul style="list-style-type: none"> <li>↑ Remove from disk with saved known-good image/last boot</li> <li>↑ Native support for 64 ACPI state</li> <li>✓ Win98/98SE provider</li> <li>☐ Support for Intel Smart Battery/Smart Controller</li> <li>↑ Use IONFC interrupt controller features</li> <li>↑ Support for Control chipset</li> <li>↑ Support for removable DVD</li> </ul>	<ul style="list-style-type: none"> <li>↑ Packet scheduler for QOS in the best support</li> <li>☐ Support for WDM 1.1</li> </ul>

## Threat Potential: BeOS

- What we know:
  - Intel encouraging and supporting Be to fill imaging hole we are leaving
  - Hitachi now offering BeOS imaging systems in Japanese retail outlets
  - Compaq, HP, Gateway also considering BeOS; played off each other
  - Whatever Be is showing, it is compelling to our OEMs
  - Be doesn't yet have 1394 DV support
  
- What we don't know:
  - Be license fee: Free to some/all? How enticing are they making it?
  - Exactly what is Be demo'ing? Hearing/seeing different things
  - When will Be have 1394 DV? What are they telling OEMs?
  - Intel is claiming problems with development - may be mis-direction
  
- What we fear:
  - (Compaq+Be) resonates in industry same way (Compaq+Cyril/AMD) did
  - (Sony brand + Be sex appeal): Windows loses association with great AV