Specifying 1394 Capabilities in PC 98 & 99 Personal Computers

Grant Ley
Texas Instruments

PC98/99 Considerations
for IEEE Std 1394

- Introduction
- PC99 Guidelines
  - Host requirements
- Meeting the Guidelines
- Call to Action

Introduction

1394 Today

- IEEE Std1394 recommended by PC99
  - Low cost, high performance bus for expansion
- OS Support Today
  - Bus class and host adapter mini-ports supported in Windows 98 and Windows NT 5.0
- Silicon Support for PCs Today
  - OHCI 1.0 compliant link layers
  - 1394a physical layers

PC99 Guidelines

Requirements and Recommendations

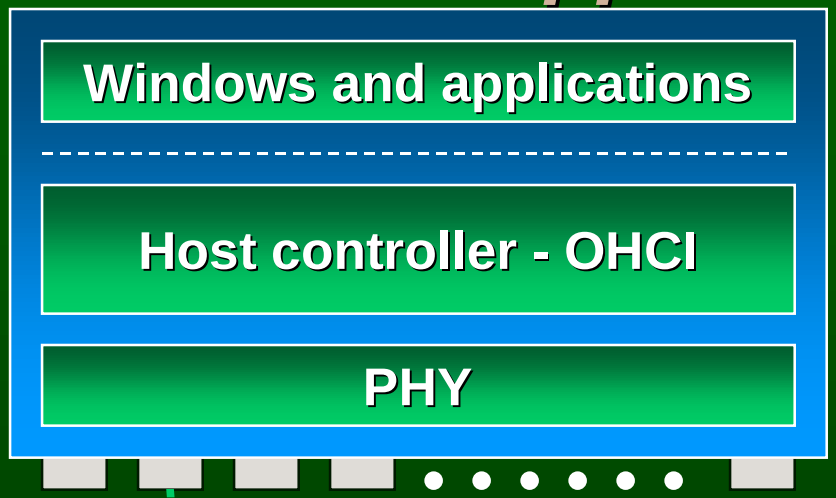
- IEEE 1394 recommended
  - At least one external port recommended
  - Likely to become required in future versions of the PC guidelines
- IEEE 1394 recommended for secondary storage controller
- IEEE 1394 implementations required to meet requirements of Chapter 8

Benefits of Implementing 1394

- High speed bus
  - 50MB (S400)
  - Expansion to 100 MB and beyond
- Asynchronous and isochronous operation
  - Provides guaranteed delivery and guaranteed bandwidth
- Plug-and-Play and hot plug support
  - Autonomous address assignment
- Ease of configuration
  - Six wire cable with no terminators required
  - Up to 63 nodes per bus

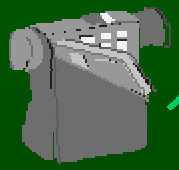
Benefits of implementing 1394

Supports many peripheral types



PC

DTV



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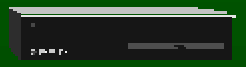
DVCR



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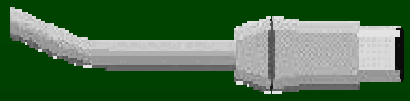

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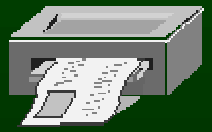

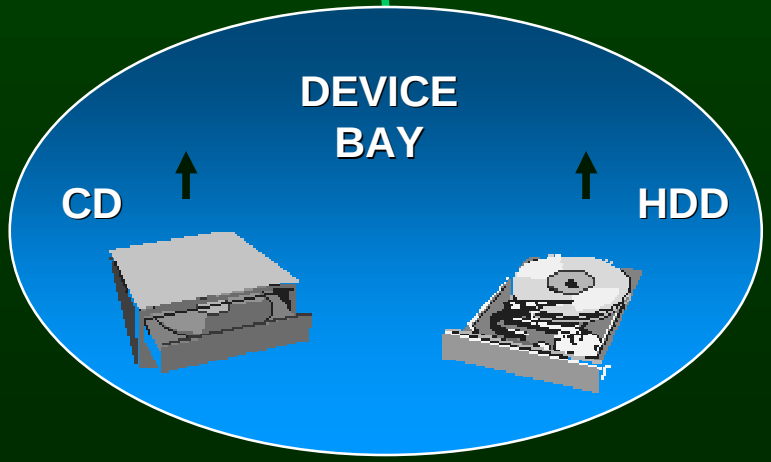

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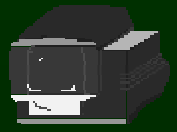


CAMERA

Host Requirements

- 1394 Open HCI 1.0 compliant
- 1394a mandatory features with backward compatibility with IEEE 1394-1995
- S100 - S400 operation
- AC-Powered PC sources cable power
- Hosts comply with power specifications
  - Cable Power Distribution Specification
  - Power Management Specification
- Hosts use six pin or Device Bay connector
- Galvanic isolation optional

Host Requirements

1394 Open HCI

- Common programming interface
  - Windows 98 and Windows NT 5.0 Support
- High performance and robustness
  - Outperforming earlier 1394 HC designs
  - Higher tolerance of excessive latencies
  - Improved error handling
- Security improvements
  - Asynchronous filter, physical filters, tag filter
  - Snooping illegal
- 1394 Open HCI 1.1 underway

Host Requirements

1394a Compliant

- All PHY ports S100 - S400 capable
- PHY connection debounce and hysteresis
- Arbitration enhancements
- Suspend/Resume

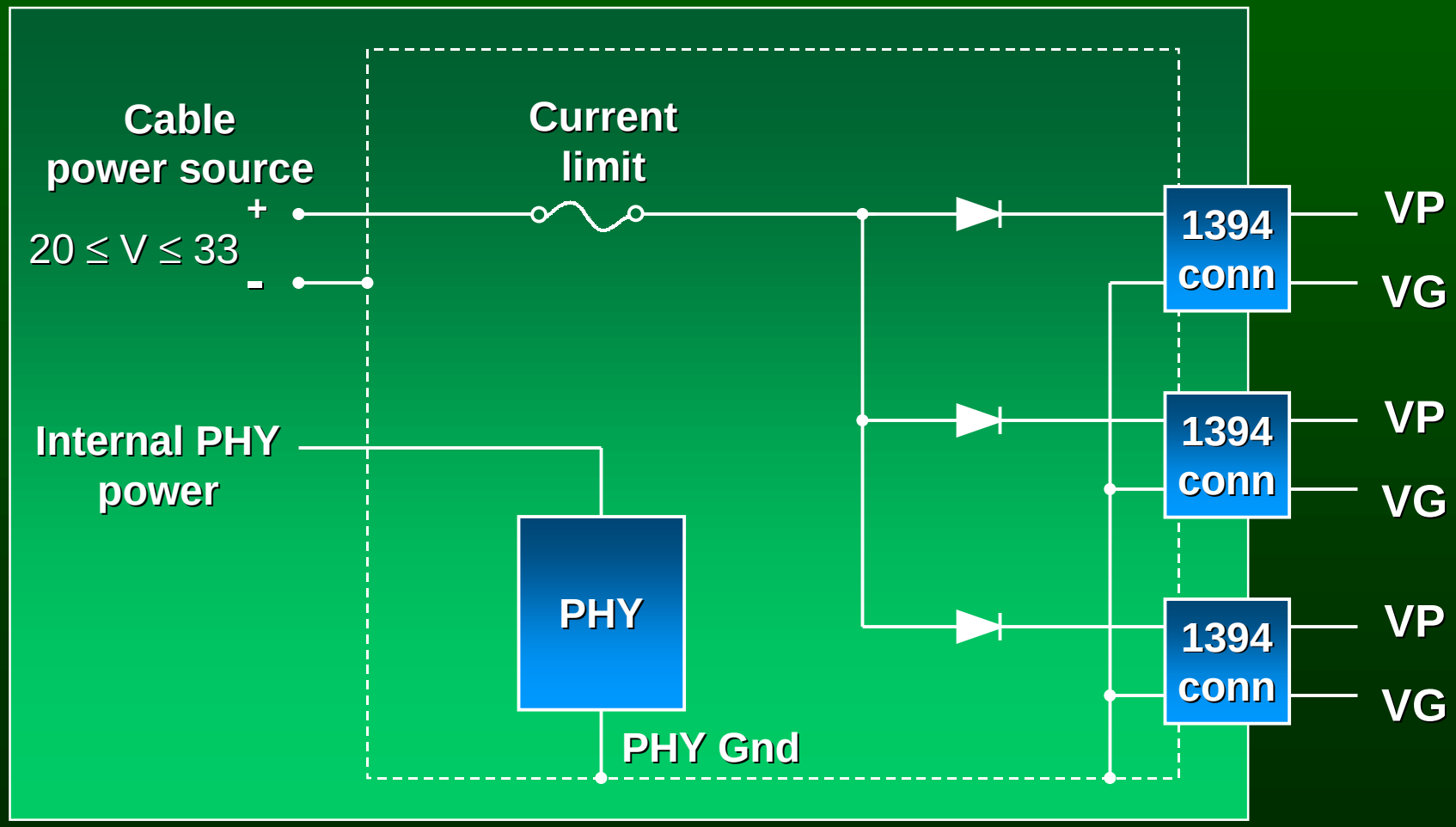
Host Requirements

Cable Power

- AC-Powered PC must source cable power
  - Power class 001b, 010b, or 011b recommended
    - Minimum 20V at 15W
  - Power Class 100b
    - Recommended to source at less than 20V
    - Must report exact power source via Config ROM
    - Alternate power providers may discontinue power
      - Must change power class in self_id to 000b
      - Must initiate bus reset after power class change
      - Example: Mobile PC on battery power
- PHYs must be powered at all times

Host Requirements

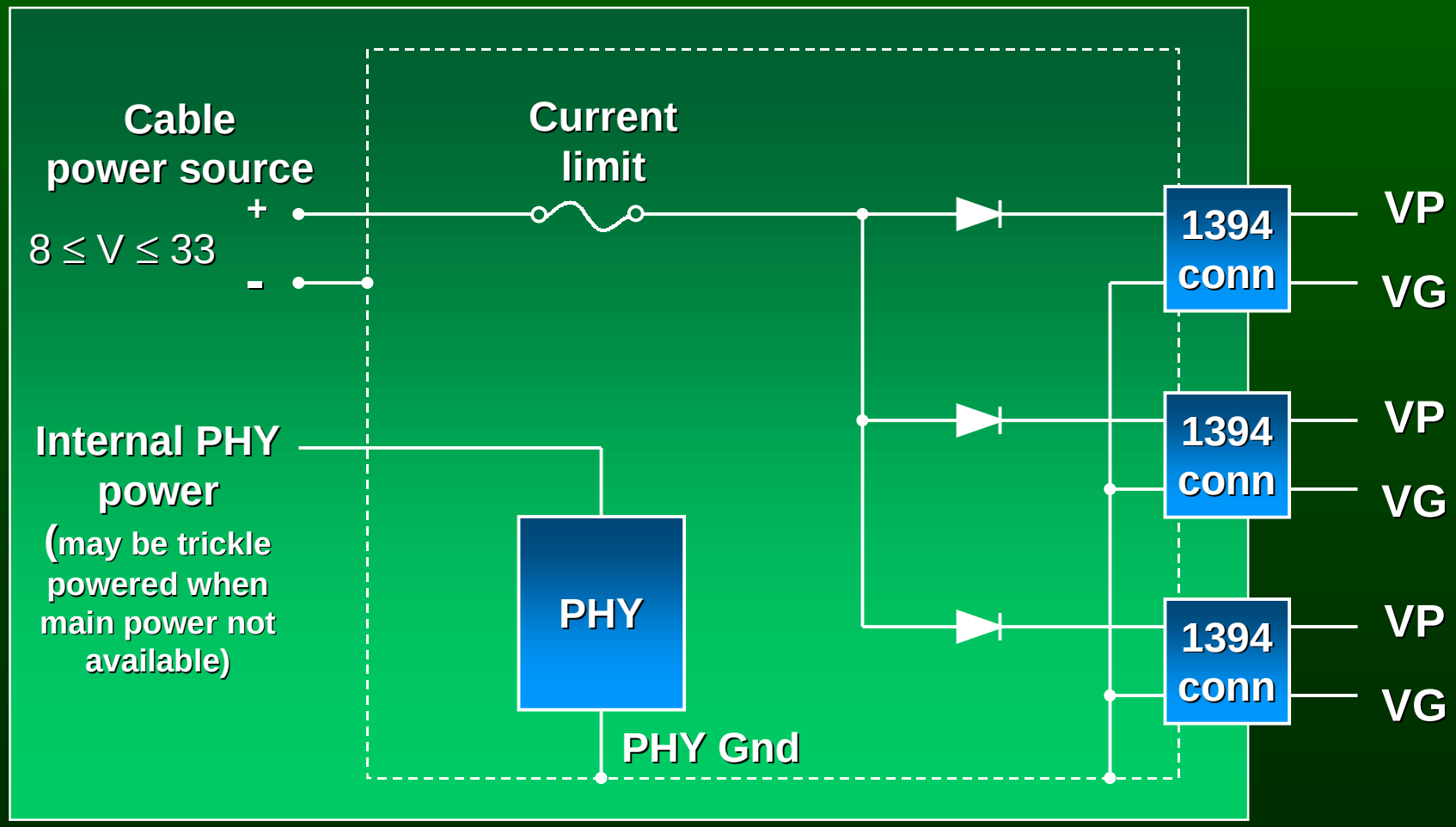
Standard Power Provider



Power Class 001b, 010b, 011b

Host Requirements

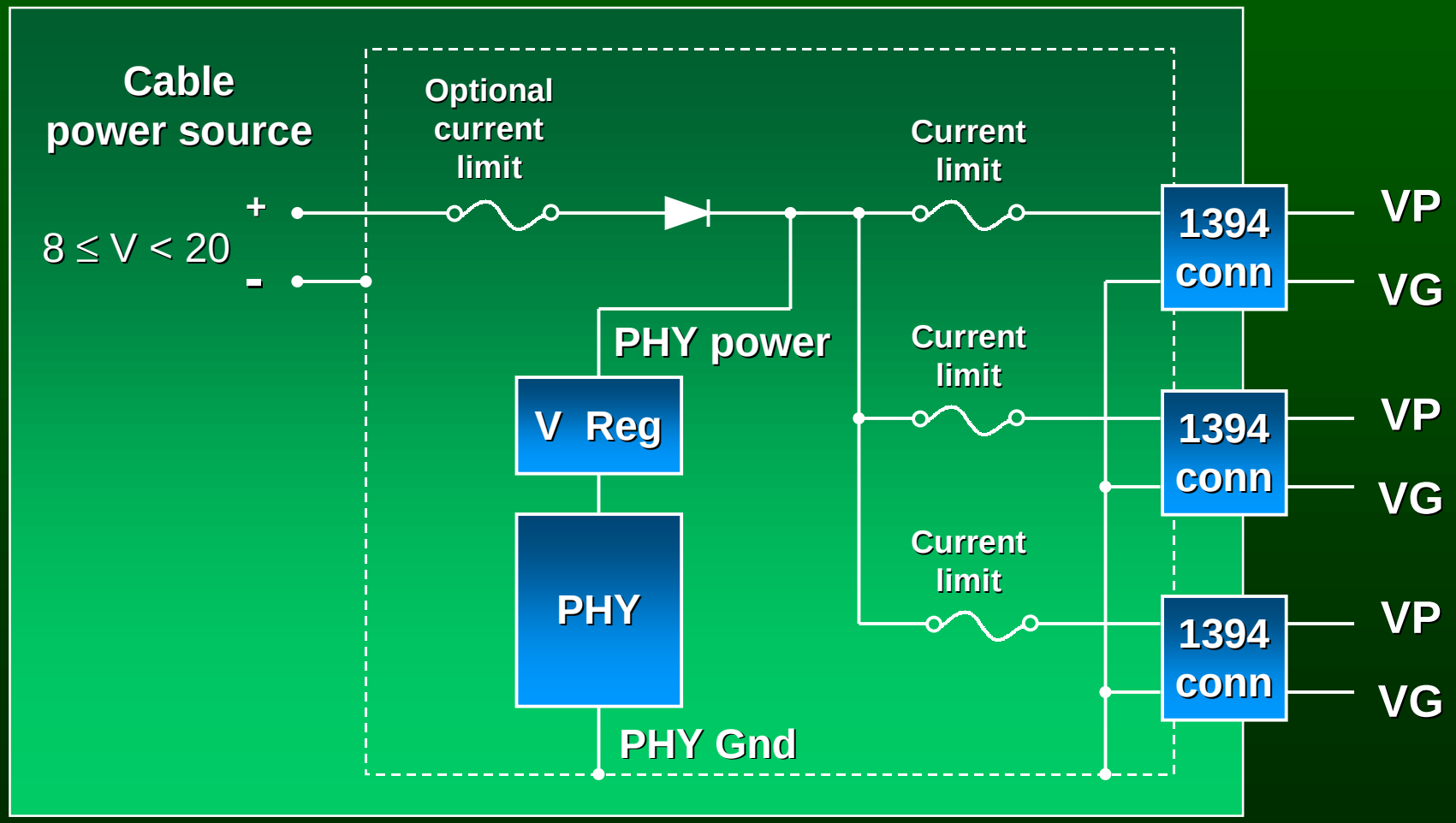
Alternate Power Provider



Power Class 100b

Host Requirements

Alternate Power Provider



Power Class 100b

Host Requirements
Power Management

- 1394 power management
  - CSRs provided by software
- System power management
  - ACPI control methods
  - PCI power management
    - Takes advantage of native capabilities

Host Requirements
Connectors

- Standard six pin connector required for walk-up ports
  - Eliminates breaks in power
  - Single connector type promotes volume pricing
  - Consistent electrical performance
  - Reduces unnecessary user choices
- Device Bay connector are an option

Host Requirements
Galvanic isolation

- Isolation is optional
  - Systems which may operate under conditions which a GND fault potential can exist should implement isolation
- If implemented must conform to 1394a
  - Bus holder isolation vs. 1394-1995 Annex J
    - Fewer components using bus holder isolation
    - Better noise margins using bus holder isolation
    - Less static power using bus holder isolation
    - Easier IC design using bus holder isolation

Meeting the Guidelines

Host PCs

- Motherboard and adapter implementations
  - Discrete OHCI link
  - Discrete 1394a physical layer
- Power class 001b, 010b, 011b requires 20V or greater power source
- Power class 100b requires Power_source_state entry in Config ROM

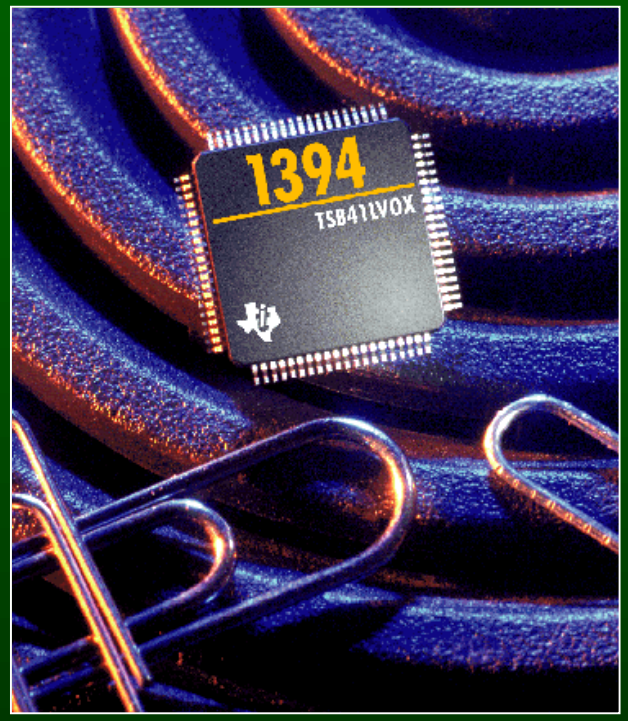
Silicon Solutions

TSB12LV22 (OHCI-Lynx)

- Industry's first 1394a and OHCI 1.0 compliant link layer
- Superior performance
  - 8 KByte FIFOs
- Integrated bus holders on phy-link i/f
  - Supports cost effective isolation
- PCI Power Management 1.0
- Serial ROM interface
  - EUID and Power_Source_State entry

Silicon Solutions

TSB41LV0x (1394a physical layers)



- 1394a (Draft 2.0) compliant physical layers
  - Suspend/Resume
- Family of 2/3/4/ and 6 port devices to support a variety of applications
- Integrated bus holders on phy-link i/f
  - Supports cost effective isolation
- Compliant with the 1394a phy-link interface

Silicon Solutions

The Texas Instruments Support

- Total solution provider
  - Physical layer devices
    - 1394a (Draft 2.0) with Suspend/Resume
  - Link layer
    - 1394 OHCI
    - Peripheral links
      - GP, MPEG2, DV
  - Embedded software support

Call to Action

- Implement 1394 enabled PCs now
  - Adapter cards
  - Motherboard solutions
  - Device Bay systems
- Build more peripherals
- Submit hardware to Microsoft for testing