Announcements

- Take box, transmitter (with batteries!), and receiver to lab this week
- Preliminary design report due at Lab 9 (next Friday). See web site.
- IEEE Meeting – Eaton, Mon., 10/13, 5:40 PM in 238 Broun -- free pizza

Preliminary Design Report

- 5% of grade
- Team receives one grade. Individual contributions will be weighted at the end of the semester.
- Format is up to you.
- Length depends on what you have to say. Be thorough, but don’t ramble.

Content of Report

- Describe first choice of all design elements.
  » resistors for voltage regulator
  » body
  » battery type, connectors
  » driving strategy
  » others?
- Justify your choices in relation to specs.
- Explain any disadvantages, and why you’ll tolerate them.
- Include supporting drawings, figures, and tables.

Preliminary Report Grading

1. Discussion of design alternatives (50%)
2. Supporting documentation for chosen design (25%)
3. Overall readability (15%)
4. Grammar (10%)

This report should help you begin to think through basic issues and get started.

Grades

- Nuck L. Head
  » 3/4 on all labs, quizzes through #5 => 75 avg
  » 3/4 on all but one, zero on one lab => 65 avg
- Goo D. Tewshuse
  » 4/4 on all labs, 3/4 on all quizzes => 88 avg

>> Turn in all labs.
>> Read the book before class, and review notes.

Engineering Visuals

- Engineering visuals can be used for one of two primary purposes:
  » design
  » reporting/documentation
**Visuals for Design**

- A visual system description can aid in assessing feasibility or be used in simulation
  - PSpice -- circuit can easily be visualized as well as simulated
  - CAD -- treats parts as objects and can be used to construct assemblies to be machined

**Visuals for Reporting**

- These visuals are not intended to be used to build a device. Instead, they are used to inform another party about your engineering work, for example, to:
  - document the operation of a device
  - report to your boss
  - tutor other engineers
  - demonstrate feasibility to investors

**Is a Picture Worth a Thousand Words?**

- The definitive answer -- it depends!
- It depends:
  - on what you’re trying to communicate.
  - on who your audience is.
  - on how reliable the picture is! (Yes, the camera does sometimes lie.)

**Pictures vs. Words**

- Words are good for abstractions and logical relationships:
  - why
  - cause & effect
  - values
- Words provide an interpretation.
- Words require greater mental engagement.
- Words communicate serially

- Figures are good for spatial relationships:
  - maps
  - dimensions
- Figures convey more raw data.
- Figures convey “big picture”.
- Figures are better for concrete information
- Figures communicate in parallel
Pictures vs. Words

- This is really not an issue of “versus”. Pictures and words complement one another when used at appropriate times.
  - Some people are visual learners, while others are auditory or abstract.
  - Visuals should support and complement text, not vice versa.

Undersea Cable Example

* Fiber strands are wrapped around a copper-coated steel wire, then shrouded in a protective Hytrel/Nylon sheath, which is hermetically sealed in a welded sheath of thin copper. The assembly is further encased in liquid polyethylene into which high-strength steel cables are embedded before the plastic can harden. *

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PSpice Text Representation

* Schematics Netlist *

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<thead>
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<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
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<td>$N_0002 ; SN_0001 ; 1k</td>
</tr>
<tr>
<td>R_R2</td>
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<tr>
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<tr>
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<tr>
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</table>

Types of Graphics Software

- CAD tools (PSpice, Solid Edge, AutoCAD) -- treat design elements as objects
- general drawing tools (Adobe Illustrator, CorelDraw) -- only simple objects are defined, but drawing is much more flexible
- painting tools (Adobe Photoshop, MS Paint) -- stores figures as images (2-D array of pixel values)
CAD tools

- Pros:
  - Can simulate real systems
  - Can quickly construct systems from predefined parts with exact dimensions
  - Can save as a set of predefined parts
  - Can rescale, modify, or create new views easily
- Cons:
  - Limited to predefined parts (very inflexible)

Drawing Tools

- Pros
  - Can use some simple predefined objects for drawing
  - Can save drawing as a set of objects
  - Can rescale/modify easily
  - Flexible drawing capability
- Cons
  - Drawings are limited to predefined patterns
  - No simulation capability
  - No multiple views or exact dimensions

Painting Tools

- Pros
  - Ultimate in flexibility -- can draw *anything*
- Cons
  - No simulation capability
  - Cannot neatly rescale, edit, or change views of objects, since no geometric objects are represented separately.
  - General drawing is slow.

Drawing vs. Painting

- Drawing Zoom
- Painting Zoom
Orthographic projection -- a 2-D representation of a 3-D object, generally showing 3 views from orthogonal directions:
- front view
- side view
- top view
Isometric -- corner of box enclosing object forms three 120-degree angles

Oblique

Perspective (One-Point)

Know the Purpose of Your Visual

- Save time
- Increase interest and attention
- Clarify an idea
- Reinforce an idea
- Prove a point
- Increase retention