Western Protective Relay Conference Speaker Timing System

Sponsor:
WSU Center for Distance and Professional Education
Team Time’s UP!

- Tim Montoya
- Frank Gonzales
- Jesse Rebeck
- Hugh Roberts
Background

The Western Protective Relay Conference in Spokane Washington is in need of a conference speaker timing system. At the conference multiple speakers are presenting simultaneously and a wireless monitoring system is needed to keep these multiple presentations synchronized.
Description

Develop two synchronized speaker timing systems that indicates to a moderator and speaker how much time is left in a presentation and displays time warnings to the speaker.
Project Outcomes / Expected Deliverables

• Two portable, yet rugged, speaker timing system units. Each unit contains a programmable master station and remote station.
• Instruction Manual.
• Technical documentation.
Initial Ideas

- The moderator stations should be:
  - 1) Able to display a countdown timer
  - 2) Programmable (presentation length, intermediate time signals)
  - 3) Able to display present time of day
  - 4) Able to display warning time indicators
  - 5) Powered by 120 volts, AC

- The remote speaker station should be:
  - 1) Wireless
  - 2) Able to display indicators for warning times so they are easily visible to the speaker, but not to the audience
  - 3) Able to display a countdown timer.
  - 4) Able to display warning time indicators (Green, Yellow, Red)
  - 5) Powered by 120 volts, AC
Example diagram of the Speaker Timing System

Master

Programing Screen/Countdown Timer

Time of day
GPS clock

Test/Reset

Start/Send

Slave

Countdown Timer

00:35:13
Needs Analysis

• Three Categories:
  - 1) Functionality
  - 2) Communications
  - 3) Physical
Needs Analysis
Functionality

- Two identical units.
- System suited for dual conference sessions.
- Stand alone units.
- Master station programmable (presentation length, warning times, etc.)
- Time indicator warning signals on the remote station for speaker to see.
- Usable for any conference (alternate locations).
- Simple and user friendly.
Needs Analysis
Communications

• Wireless communication between master and slave stations
• Synchronized time-of-day clocks on master stations for moderators.
  - Synchronized to standard signal such as GPS or WWVB.
Needs Analysis

Physical

- Long product life
- Economical
- Durable and rugged
- Compact and portable size
- Lightweight
- Powered by 120 volts, AC
Constraints

• **Budget**
  - Sponsor would like to build each unit for $300.

• **Time**
  - Deadline for successful completion is the third week of October.

• **Station size:**
  - Master station is about the size of a notebook (12x8 inches).
  - Remote station should be about half the size of a notebook (6x8 inches).
Target Specifications

- Product life $\geq$ 20 years
- Durability - can withstand 4 ft drop
- Unit price $\leq$ $300
- Wireless Communication range $\geq$ 50 ft
- Master clock synchronized to GPS or WWVB
- Remote station base area $\leq$ 48 in$^2$
- Master station base area $\leq$ 96 in$^2$
- Master/slave weight $\leq$ 5 lb
- Acceptable power supply - standard 120 VAC power outlet
- Remote time counter accuracy $\geq$ 1ms
- Time to program $\leq$ 1 minute
What we have Discovered

- Can use an FPGA to bridge RS232 to an i2c LCD driver
- A prepackaged serial to wireless bridge
- Similar products that exceed our target price and size.
Any Questions???