

Client Status Presentation

- Team Members:
 - Tom Hamilton *Treasurer*
 - Kevin Harkins *Document Coordinator*
 - Alan Kinnaman *Team Leader*
 - Robert Napper *Liaison*
 - Bill Okyere *Secretary*

Presentation Overview

- Problem Statement
- Requirements & Specifications
- Design Plan
 - Philosophy
 - Approach
 - Deliverables
- Schedule

Problem Statement

- In a fast-paced clinic, administrators feel the need to upgrade to a modern automated system.
- Inexpensive systems exist, but lack capabilities.
- Complex systems cost more, and require significant design for each application.
- *Our goal is to design an affordable, modular electronic system that will effectively improve a typical medical clinic's workflow.*

Problem Statement

Simple Mechanical Systems

- Outdated.
- Cumbersome.
- Not automated.
- Do not prioritize workflow.

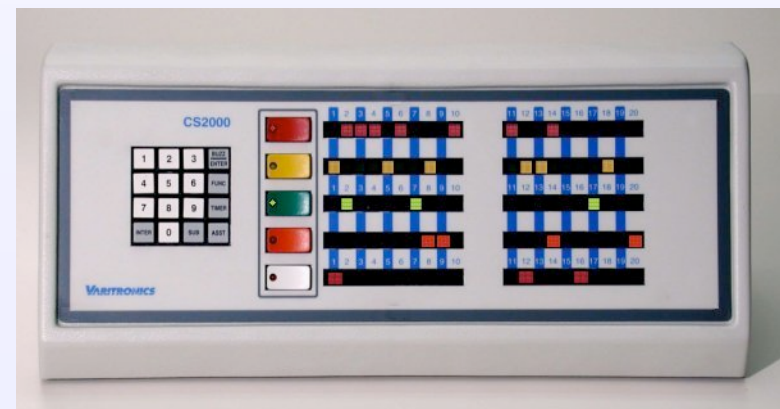


source: www.carstens.com

Problem Statement

Available Electronic Systems

- Inexpensive systems lack capabilities.
- More comprehensive systems are expensive.
- Can be complicated.
- Require design for each application.

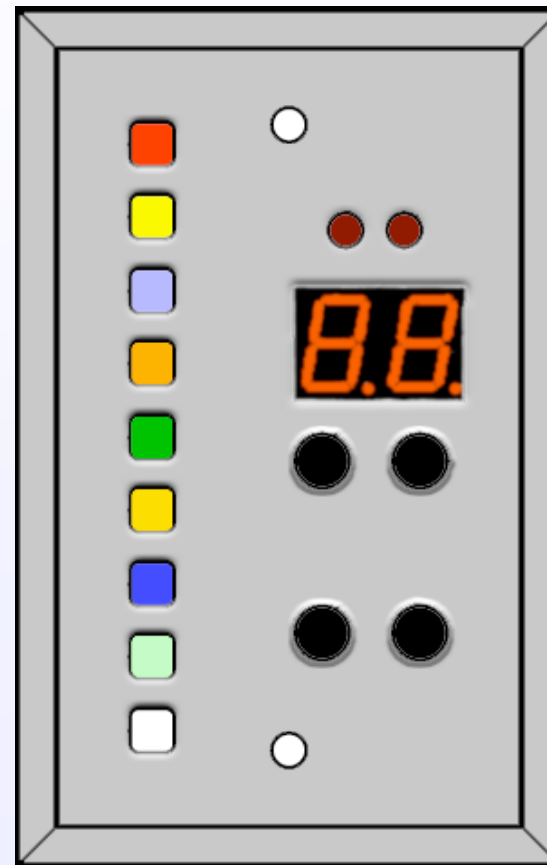


source: www.varitronics.com

Problem Statement

Our Goal

- Affordable.
- Modular.
- Easy to use.
- Improve a typical medical clinic's workflow.



Requirements

Environment

- Temperature
 - Must not build up excessive heat within the box.
 - Will be designed to meet microcontroller specifications.
- Humidity
 - Must tolerate excessive moisture within the wall.
 - Must use fuses or circuit breaker.
- Vibration/Shock
 - Must withstand wall vibrations.

Requirements

Mechanical

- Size
 - Single gang electrical outlet box.
 - Made from a simple outlet box blank.
- Weight
 - Each station will be mounted in an electrical outlet box, which is where it will be permanently installed and will not pose a constraint.
- Packaging
 - Proper electrical grounding and isolation.

Requirements Documentation

- User's Manual
 - System configuration.
 - Day to day operation.
- Maintenance Manual
 - Maintenance and installation procedures.
 - Design documents.

Requirements

Electrical

- Microcontroller
 - Electrical requirements pertain to the specifications.
- Power
 - One or more power supplies.
- Interfacing
 - Reliable communication link and protocol.
 - Each unit contain its own microprocessor.
- Safety
 - Must meet all electrical codes and regulations.

Specifications

Absolute Maximum Temperature	+125°C
Size of electronics component	Must not be greater than the following Height = 2__ Width = 2__ Depth = 2__
Size of control panel	Typical electrical outlet blank Height = 4__ Width = 2__
Weight	No pertinent constraint
Interconnection	Multiple twisted paired telephone cable or thermostat cable
Protection	Electrically isolated from ESD and if a metallic blank is used then it must be properly grounded.
Controls	Pushbuttons must be durable to withstand years of daily use.
Microprocessor Type	Microchip PIC16F877
Voltage Rating	2.0 to 5.5 Volts
Communication Link Type	13-pair cable
Communication Protocol	RS-485
Electrical Guidelines	The National Electric Code

Design Plan

Philosophy

- System Performance
 - Must not rely on a single controller.
 - Units are modular and interconnected.
 - Failure of a unit shouldn't affect others.
 - Superior to switch-based logic systems.
- Ease of Operation
 - Simple for new users to learn.
 - Improve the workflow.

Design Plan

Philosophy

- Installation
 - Wiring should be simple.
 - Should not require extensive programming.
 - Automatic communication between units.
- Quality
 - Meets needs of a fast-paced and demanding workplace.
 - User-friendly alternative to existing office technologies.

Design Plan

Philosophy

- Schedule
 - Four stages of design process:
 - Requirements
 - Proposal
 - Design
 - Implementation phase
 - Capstone design conference: April 25th, 2004

Design Plan

Philosophy

- Cost Analysis
 - Minimize costs associated with final product.
 - Report costs to client.
 - Overall costs must remain within our client's means.
- Design Safety
 - Safety issues are incorporated in our design.
 - Will be safe to the user, patients, doctors.
- Maintainability
 - Doesn't need substantial amount of maintenance.

Design Plan

Approach

- Goals
 - Communication within medical clinic.
 - Patient-doctor
 - Doctor-medical assistant
 - Doctor-front desk
 - Cleaning attendant
 - Provide a modular design for ease of upgrading.
 - Able to be marketable to other doctors offices.

Design Plan

Approach

- Subsystems
 - Basic functionality
 - Hardware
 - Interface chip with output lights.
 - Interface chip with power supply.
 - Interface communication chips with each other.
 - Software
 - Networking

Design Plan

Approach

- Team Organization
 - Each problem should be distributed according to a group or team member based upon a team member's strengths.

Design Plan

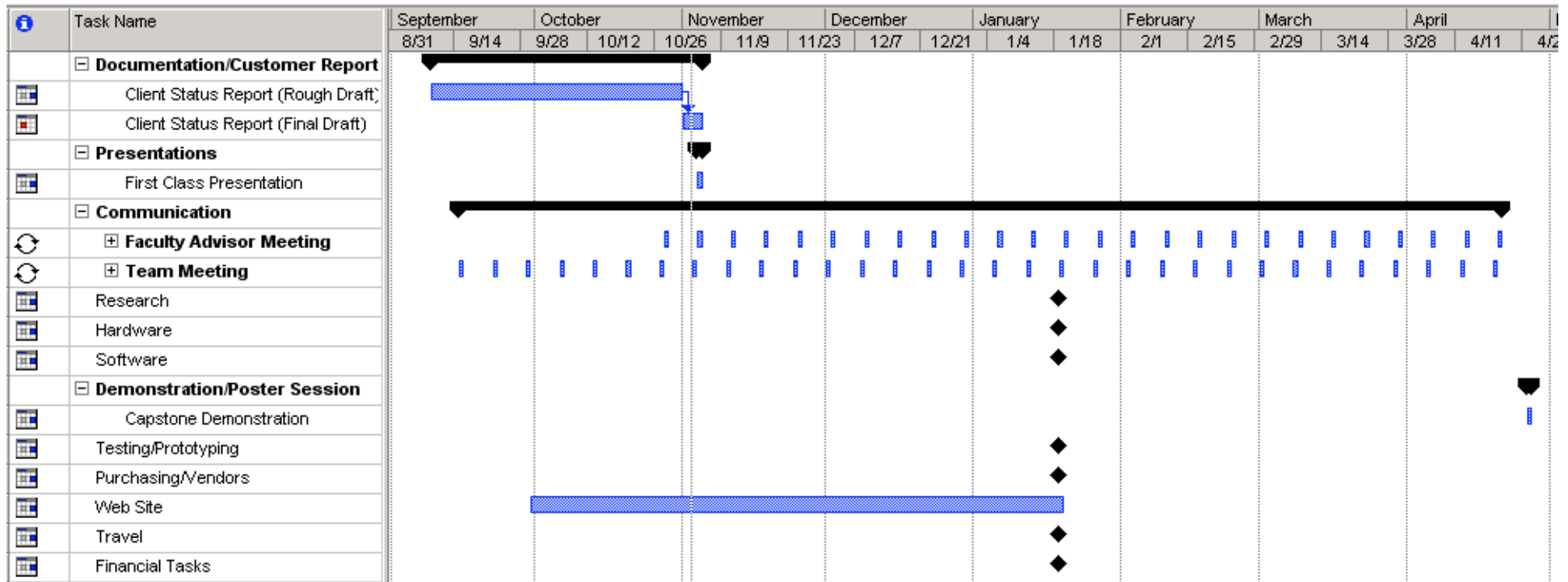
Deliverables

- Client Status Report
- Proposal Document
- Status Report
- Final Product, Installed
- Capstone Design Conference
- Final Report

Team BRAKTech MEDICAL CLINIC CALL LIGHT



Schedule





Questions?