EE-595
Sustainable Aquarium System
Team 6

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EE-595
Sustainable Aquarium System
Description

Purpose of Product:
Electronic control system designed to stabilize the environment of an aquatic life-nourishing environment.

Features:
Through the use of a computer coupled with a user interface, this product will provide the consumer control over the following environmental concerns:

1. Temperature: Allows for automatic monitoring and adjusting of the aquatic temperature range.
2. Lighting: Programmable LED banked lighting offers the user control over the amount of light introduce to the environment as well as adjustable day and night settings.
3. Feeder: Motorized auto-feeder capable of programmable feeding frequency as well as an empty feeder alert.

Market:
This product has been designed for residential and light commercial usage within the United States and Canada.
EE-595
Key Requirements

Cost:
- Sales Price: $130.00
- Component Cost: $85.00
- Assembly & Test Cost: $15.00

Environment:
Designed for a stationary indoor environment only.
• Operating Temperature: 5°C-60°C
• Operating Humidity: 0%-95%

Power Input(s):
• Residential AC Voltage: 102-132 V_{AC} @ 3.5 A_{max}

Major Functions:
• On/Off
• Set Light Quantity and Schedule
• Set Temperature Range
• Set Feeder Frequency

Quantities Measured, Displayed:
• Temperature:
  Range: 0°C-60°C; Sensor Accuracy: +/-1°C;
  Control Accuracy: +/-3°C; Resolution: 1°C

• Lighting:
  Sensor Range: 0-6800 lux; Sensor Accuracy: 50 lux; LED Range: 0-200 LED Accuracy: 50 lux; Input Resolution: 50 lux

• Time:
  Range: 0-24 Hours; Accuracy: 1 Minute; Resolution: 1 Minute
EE-595
Block Diagram

A: Power Supply
B: CPU/UI
C: Lighting
D: Temperature
E: Feeder

120 V AC

Line Filter w/ GFCI

Phototransistor

Transimpedance Amplifier

MOSFET Driver Circuit

50||Banks of 3 LEDs

+5 V DC

+12 V DC

SMPS

CPU

5 Button Switches

2(S PI)

3.2” LCD

+5 V DC

MOSFET

DC Feeder Motor

Temperature Sensor

Power MOSFET

Heat Pump

Feeder Sensor

Light Sensor

Timer

Heat Signal

Temp Signal

Output Filter

Line Filter w/ GFCI

CPU

MOSFET Driver Circuit

Phototransistor

Transimpedance Amplifier

MOSFET

DC Feeder Motor

Temperature Sensor

Power MOSFET

Heat Pump

Feeder Sensor

Light Sensor

Timer

Heat Signal

Temp Signal

Output Filter
Auto Pet Feeder
Team 7

Xinye Xu
Jing Chen
Jacob Alward
Ruishuang Zhong
Timothy Sentz
Jingduo Fan

EE-595
Auto Pet Feeder

- Purpose of Product: An automated meal dispenser to provide nourishment for your pets while away from home.
- Feature1: Programmable
- Feature2: Self Cleaning
- Feature3: Monitors food levels
- Market: North America
EE-595
Key Requirements

• Cost
  – $99.99 (Sales Cost) Component Cost $50.00, Assembly & Test Costs: $30.00

• Environment: Indoors, Stationary
  – Operating Temperature (0 C to 50 C or 32 F to 122 F)
  – Operating Humidity Range (30 to 60 %)

• Power Inputs
  – Residential AC Power (120 V @ 60 Hz @ Max 20 Amps)

• Major Functions
  – Dispense Food Amount Determined By User @ 5% accuracy by weight
  – Dispense Water Amount Determined By User @ 5% accuracy by weight
  – Automatic Food Disposal After Eating Period (food is removed)
  – Program (Inputs are 5% accurate)
Block Diagram

Block Ownership

A. Power Supply: Jing Chen  
B. Feed Circuit: Xinye Xu  
C. Food Removal Cleaning System: Ruishuang Zhong  
D. Sensor System: Jingduo Fan  
E. User Interface System: Jacob  
F. Microcontroller: Tim