Tidal Controller Overview Course

- **Synergy Controller**
- **VersaTenn V**
- **ProTouch**

- **Randolph, NJ**

1.0 INTRODUCTION

Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award-winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company further provides product development services together with engineering support, and is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA systems.

2.0 SPECIFICATIONS

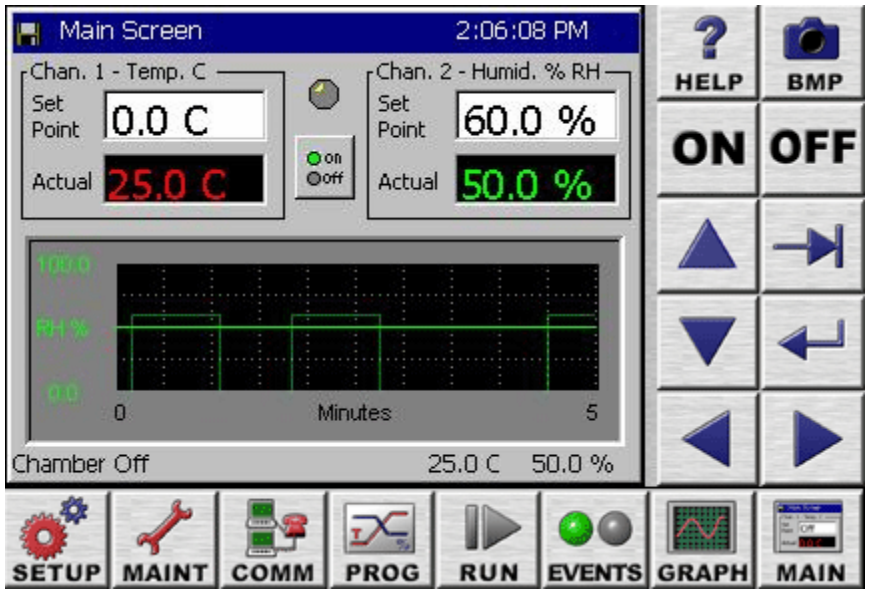
- The following slides detail the specifications for the three types of Tidal Engineering Controllers:
  - Synergy Controller
  - VersaTenn V
  - ProTouch

Channels

- **Channels: 1 or 2 Process Variables**
  - **Temperature**
  - **Temperature/Humidity**
  - **Temperature/Temperature**
  - **Resolution:**
    0.1 Degree C or F, 0.1 % Relative Humidity

LCD

- **Type: Color STN**
  - **Resolution: 320 x 240**
  - **Size: 5.7” Diagonal**
  - **Backlight: CCFL**



Operating System

- **Microsoft Windows™ CE Operating System**
- **Touch Screen based Graphical User Interface (GUI)**

Communications

- **RS - 232 Communications**
  - **10/100 Base-T Ethernet Networking**
  - **RS – 485 Communications (optional)**
  - **IEEE 488 Communications (optional)**
  - **Webtouch Remote™ (Pat. Pending) Web Server software for internet monitoring / controlling (optional)**

Storage

- 8, 16, or 32 MB Flash Disk On Chip Storage
- 3-1/2 Floppy Drive (IBM Formatted) Program and test data storage and retrieval
- 32 MB SDRAM, USB Hard Disk, Flash Disk USB Hard Disk

Processors

- Main Processor, National Semiconductor x86 Pentium Class
- I/O Processor, Rabbit Semiconductor R2000
- Touch Screen Controller Processor, Microchip PIC16F876

Peripherals

- Universal Serial Bus (USB), 2 Host Ports
- VGA Monitor
- PS/2 Keyboard and PS/2 Mouse

Programming

- Windows friendly program files names.
- Program creation wizard.
- Step Types:
  - Set Point
  - Jump Loop
  - Auto Start
  - Hold
  - Stop
- Number and size of programs only limited by onboard storage

Software Features

- Built-in context sensitive Help System
- International Language Support
  Real-time color graph displays
- Built-in TCP/IP networking
- Real Time Clock with Battery Backup
- Automatic Resume after power failure
- Software configurable chamber type

Analog Inputs

- **Process Voltage Inputs (4): Range: 0-5 VDC; Accuracy: +/- 0.5 mV, Resolution: 16 bits**
- **RTD Inputs (2):**
  Range: 0 to 200 Ohms, Accuracy +/- 0.05 Ohms
  100 Ohm Pt. RTD, JIS or DIN
- **Machine diagnostics interface (8)**
  Range: 0-5 VDC; Accuracy: +/- 10 mV
  Resolution: 10 bits

Analog Outputs

- **Voltage Outputs (2): Range: 0-5 VDC;**
- **Accuracy: +/- 0.5 mV, Resolution: 12 Bits**
- **Analog Output Functions:**
  - **Setpoint CH1, Ch2 or CH3**
  - **Actual CH1, Ch2 or CH3**
  - **Heat PID CH1, Ch2 or CH3**
  - **Cool PID CH1, Ch2 or CH3**

Digital Outputs

- **Total Digital Outputs: 32**
- **Triac Outputs: 30**
  - **Output Rating: 5 A, 250 VAC**
- **Relay Outputs (2)**
  - **Contact Rating: 3 A, 250 VAC**
- **Event Outputs: 6**
  User controllable Triac Outputs

Digital Inputs

- **Total Digital Inputs: 16**
  - **Ground: TRUE**
  - **Open Circuit: FALSE**
- **Voltage Range: - 0.5 to 5.5 Vdc**

Data Logging

- **Interval, 1 Second to 3600 Seconds**
- **Data**
  - **Process Variables**
  - **Setpoints**
  - **PID variables**

UUT (Unit Under Test) T-Type Thermocouple temperature data

UUT (Unit Under Test) T-Type Thermocouple temperature data

- **logging and display with 16 Inputs expandable to 64 Inputs.**
  UUT Temp Module
- **T-Type Thermocouples: 16**
- **Total Supported Modules/Sensors: 4/64**
- **Temperature Range: -200 C to 400 C**
- **Power: 9 to 28 Vdc, 3 Watts**

Alarms

- Low Program Memory
- Low Space Storage Card
- Temp Guard IV
- Open Sensor Ch 1 - RTD 1
- Open Sensor RTD 2
- Voltage Sensor Ch 2 – Humidity (Analog Input 1)
- Voltage Sensor (Analog Input 2 thru 4)
- Hi Temperature/ Low Temperature
- Hi Humidity/ Low Humidity
- Internal Communications failure

Other

- **Power Requirements: 85 to 264 VAC, 25 Watts**
- **Operating Temperature: 10 to 30 C**
- **Operating Humidity: 0 to 90% RH, Non-condensing**
- **Size: 22” X 3.25” X 13”**
- **Weight:**
  Main Unit: 8.5 lbs,
  Olympic I/O Controller: 0.4 lbs.
- **Shipping Weight: 15 lbs. total including reusable shipping container**

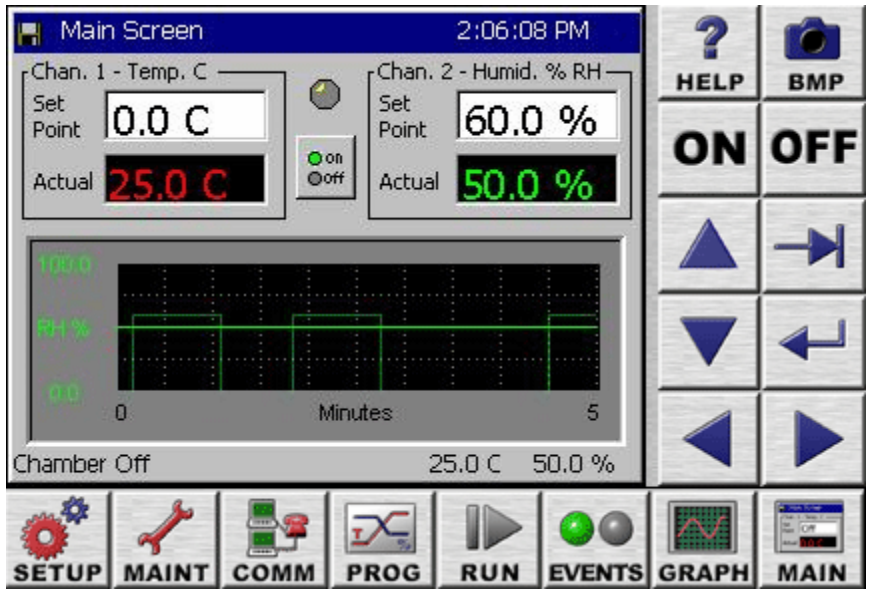
3.0 CHAMBER / CONTROLLER POWER-UP

4.0 FRONT PANEL

- 4.1 Synergy Interface Panel Layout
  - 4.2 Front Panel Operator Interface
  - 4.3 Touch Screen
  - 4.4 LCD Screen
  - 4.5 Function Keys

5.0 NAVIGATION SCREENS

- There are eight Navigation Screens



6.0 SETUP AND CONFIGURATION

- 6.1 Setup Directory Table
  - 6.2 Calibration
  - 6.3 PID
  - 6.4 Special Functions
  - 6.5 L - Values
  - 6.6 Settings List
  - 6.7 Device Primitives and Logic Flow Charts
  - 6.8 LCD Settings
  - 6.9 Chamber Setup
  - 6.10 Output Mappings by Chamber Type
  - 6.11 Logging
  - 6.12 Logging Sequence of Operation
  - 6.13 Panel Lock
  - 6.14 Languages

7.0 MAINTENANCE DIRECTORY

7.1 Operator Interface

7.2 Alarm Functions

7.3 Utilities

8.0 COMMUNICATIONS DIRECTORY

8.1 Operator Interface
- 8.1.1 RS-232
- 8.1.2 RS-485
- 8.1.3 IEEE 488
- 8.1.4 Ethernet
- 8.1.5 TCP/IP
- 8.1.6 Web

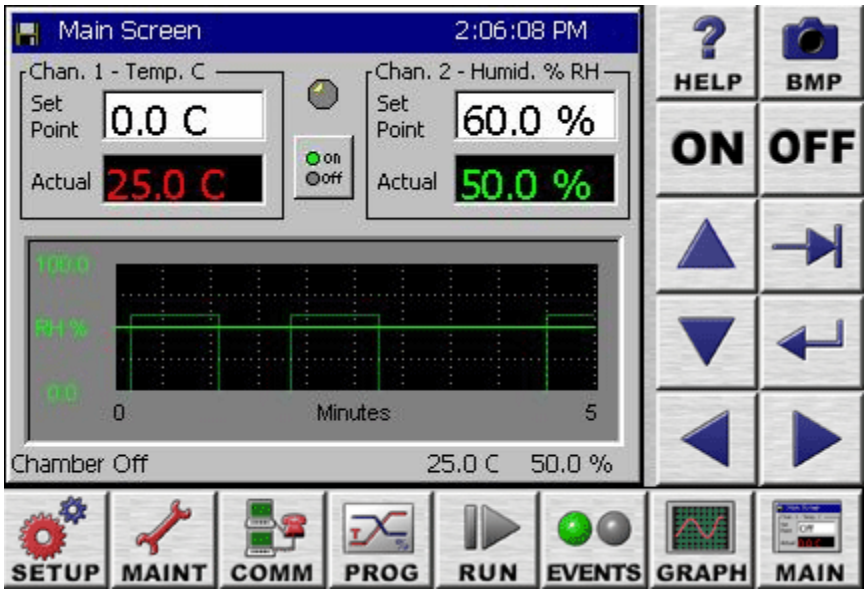
8.2 Synergy Web Server

8.3 Software Applications and Sample Networks
- 8.3.1 Synergy SimpleComm Communications Software
- 8.3.2 Synergy Manager PC Based Chamber Control Software
- 8.3.3 Ethernet MAC Address
- 8.3.4 Sample Networks

9.0 PROGRAMMING THE CONTROLLER

9.1 Loading a File: From Storage Card, USB Disk or Floppy
9.2 Creating a New Program: Add Step Wizard Feature
9.3 Step Type Descriptions
9.4 Synergy Program Sheet
9.5 Copying, Editing and Deleting a Step
9.6 Saving a Program
9.7 Running a Program

10.0 MANUAL OPERATION



11.0 EVENTS DIRECTORY

11.1 Events Outputs Screen
11.2 UUT Module (Unit Under Test)
11.3 Digital Outputs
11.4 Digital Inputs

12.0 GRAPH SCREEN

12.1 Temperature / Humidity / Air Temperature

13.0 UUT MODULE
(UNIT UNDER TEST) DATA ACQUISITION

13.1 UUT Overview
13.2 Setup Procedure

14.0 CASCADE TEMPERATURE CONTROL

14.1 Description
14.2 Installing Cascade Software
14.3 Configuring Cascade Software
14.4 Using Cascade Mode

15.0 TURBO HUMIDITY

15.1 Turbo Humidity Introduction
15.2 Turbo Humidity Use

16.0 APPENDIX A RESOURCES

16.1 Web Site Resources
16.2 Other Documents

17.0 APPENDIX B OLYMPIC BOARD DIAGRAM

- The Olympic Board is the Input/Output Controller

18.0 APPENDIX C SYNERGY COMMUNICATIONS COMMAND SET

- ASCII Command Set Examples

  ? SP1 //Query Setpoint for Channel 1

  = SP1 23.0 //Set Ch 1 Setpoint to 23.0º

- Complete command set at www.tidaleng.com