CONSOLES & CONSOLE DIAGNOSTICS – OVERVIEW
TECHNICAL CERTIFICATION TRAINING

Field Engineering | 2010

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Course Objectives

- Consoles Overview
  - Life Fitness Consoles
  - Core Features Highlight
  - Value to Our Customers
  - Tips
- Console Diagnostics High Level Overview
  - General Overview of Diagnostics
  - System's perspective
  - Common Diagnostic States
  - Product Specific Diagnostic States Worth Knowing
- Summary

Consoles - Overview

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Life Fitness Consoles

- Life Fitness currently uses three very distinct types of console displays:
  - LCD
    - PC/Laptop computer type displays
    - Software in-field updatable (CF card OR USB)
  - Etched LCD
    - Type of an LCD that is used by watch manufacturers
    - Software not in-field updatable
  - LED
    - Light Emitting Diodes are used to display messages and workout/diagnostic parameters to the user
    - Software most likely in-field updatable, if CSAFE connector present

Life Fitness Consoles (cont.)

» Pictures of PC/Laptop computer type LCD displays

7-inch LCD with a touch screen. Above a 7-segment LED-based display. Sides and bottom: LED-backlit keypad.

LF Name: **Inspire**

Entire display is an LCD with a touch screen. There are no hardware buttons.

LF name: **Engage**

Life Fitness Consoles (cont.)

» Pictures of Etched LCDs similar to the ones used by watch manufacturers

Entire display is
an etched LCD.
LF name: **Blue Console**.

The message center (upper part of the display) is an etched LCD, remaining displays are LED-based.
LF name: **NDT** (New Display Technology)

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Life Fitness Consoles (cont.)

- Pictures of LED-based console displays (red, amber, and presently very rare green)

LF Name: **Classic**

LF Name: **Achieve**

LF Name: **Integrity**

Life Fitness Consoles

- Critical console components (user's perspective):
  - Display
  - Touch screen (if equipped)
  - Keypad (if equipped)
  - Bezel

  Note:

  Always check proper functionality of the above components
- All consoles are part of a larger system – personality changes (or must be changed manually) with respect to base (bike <-> CT)

Life Fitness Consoles

- Other in-console boards and items connected to it:
  - Telemetry heart rate boards
  - Contact heart rate sensors/boards
  - Television tuner
  - iPod authentication chip
  - Interface (IF) board, a.k.a. Machine Interface Board (MIB)
  - Side-display
  - FitLinxx modules and other devices connected to a CSAFE port
  - Motor controller (MC, or sometimes referred to as a Controller)
  - Generator Board Controller (GBC)
  - Alternator Control Board (ACB, or sometimes referred to as Alternator Board Controller, Power Control Board, or simply Controller)
- Functionality of the above modules can be verified in consoles' respective diagnostics
- *All of the above sub-modules will be discussed in detail in suitable console and/or diagnostic presentations (primarily hands on)*

Core Features Highlight

- Core Features highlight (some of them listed before)
  - Most often used by our customers are:
    - Display
    - Keypad/touch panel
    - Heart rate telemetry
    - Contact heart rate
    - Speed/Incline (motor controller)
    - Resistance adjustments (the generator brake controller and the generator, the alternator control board and the alternator, the consumer systems control board and the eddy current brake system)
    - TV
    - iPod
  - Generally common diagnostics (for details see diagnostics presentation)
    - Follow the list above
    - You MUST master the methods used to troubleshoot the above subsystems utilizing diagnostic tools built into the consoles

Value to Our Customers

- A console speaks volumes about our product's quality and your (technician's) quality of service
- After repair:
  - No greasy stains allowed
  - Make an attempt to clean it:
    - Delight the customer
    - See how the product is used or abused

Tips

- Display, keypad, console bezel, and any additional subsystems must function correctly (use diagnostics whenever possible!)
- When swapping out boards, exercise caution
  - Static electricity
  - Over-tightening board's screws
  - Loose connections of various kind or forgetting to connect
- After the repair, make sure that the entire machine works fine
  - Program in a workout
  - While in a workout try out all of the core features

Console Diagnostics High Level Overview

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General Overview of Diagnostics

- Vocabulary Used in this Presentation
  - State – a software engineering term. For the end user it can be thought of as one of the many "screens" presented to the user when using the diagnostics or when programming and using a workout.
  - GUI – graphical user interface
- Purpose of Diagnostics:

  to **aid** in analysis of a problem with the machine
- Getting in to Diagnostics
  - LED consoles: Clear Key x 2, **while the console is blank press and hold** the Pause Key. If that did not work try the Clear Key and any other key (for example Cool Down) to enter diags.
  - LCD consoles: Transition to the workout selection screen.
    - Elevation consoles (Engage and Inspire): after transitioning to the workout selection screen, triple tap on the Life Fitness logo
    - Integrated LCD: after transitioning to the workout selection screen, press the Cool Down button, while holding it depressed triple-tap the LF bug.

General Overview of Diagnostics (cont.)

- Navigating through the Diagnostic Structure
  - LED and etched LCD products:
    - use the documentation outlining what can be found and where
    - display limitations -> slower navigation
  - LCD products:
    - Very easy to find various diags.
    - GUI -> faster navigation.

System's perspective

- When working with diagnostics make sure that you understand how a diagnostic state can be used to troubleshoot a specific aspect or aspects of the system.

- For example:
  Assume: Telemetry enabled.
  No Telemetry does not imply failure of an HR receiver.

  DO NOT ASSUME THAT JUST BECAUSE A DESIGN ASPECT DOES NOT WORK IN DIAGNOSTICS THAT IT TRULY IS AT FAULT.

  It simply means that the console is not getting a signal from the sub-module being tested.

Cross-Platform Diagnostic States

- Most Useful Cross Platform Diagnostic states:
  - System Test
    - System Communication Test (on Treadmills and GBC-equipped non-Treadmill products)
    - Keypad Test
    - Heart Rate Tests
      - LifePulse
      - Polar
    - External Serial EEPROM Test
    - CSAFE Network Test/Status
    - CSAFE Loopback Test
  - Information
    - Statistics
    - Software Versions
    - System Errors
    - Maintenance Information (treadmills only)

Cross-Platform Diagnostic States (cont.)

- Most often used Common Diagnostic states (cont.):
  - Configuration
    - Manager
    - TV/FM Radio (LCD units)
    - Touch Screen Configuration (LCD units)
    - Export/Import Settings (LCD units)
  - Maintenance (treadmills only)
    - Any of the choices can be selected

Product Specific Diagnostic States Worth Knowing by Heart

- Treadmills:
  - System Test
    - Motor Modules
    - Stride Sensor
  - Information
    - Belt/Deck Information
    - Maintenance Information
- Non-treadmills:
  - System Test
    - System Diagnostics

Summary

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Summary

- Consoles Overview:
  - Types of Life Fitness' consoles:
    - LCD
    - Etched LCD
    - LED
  - Core Features Highlight
    - Generally common functionality
    - Generally common diagnostics (see diagnostics presentation)
  - Value to Our Customers
  - Tips
- Console Diagnostics Overview:
  - Diagnostics in general: purpose, getting in, navigating
  - Diagnostics are supposed to be used from the system's point of view
  - Common diagnostic states that exist in majority of Life Fitness products and are worth knowing by heart
  - Product-specific diagnostic states that are worth knowing by heart

Questions

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