



LCD CONSOLES DIAGNOSTICS TECHNICAL CERTIFICATION TRAINING

Field Engineering | 2010

Life Fitness
WHAT WE LIVE FOR

Course Objectives (focused on the TREADMILL)

- » Introduction
- » Entering Diagnostics: Inspire Console
- » Entering Diagnostics: Engage Console
- » Entering Diagnostics: Integrated LCD
- » Product Specific Diagnostic States
- » Simulation of Diagnostics on a PC/Laptop
- » Common Issues
- » Summary

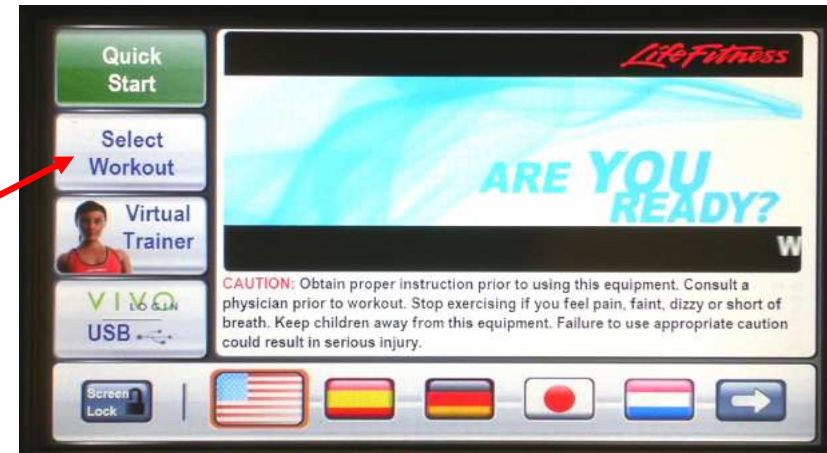
Introduction

- » Knowledge of the Elevation series diagnostics (Engage and Inspire Consoles) -> knowledge of the 12" Integrated LCD console diagnostics.
- » Beware of the design differences: alternator- vs. generator-based systems.
- » The purpose of this presentation is to focus on the treadmill diagnostics. Service Manuals describe how to use the other diagnostics of other products.

Entering Diagnostics: Inspire Console

Welcome Screen / Are You Ready

Press the **Select Workout**



Triple tap



in one second intervals

Lower RT corner



Entering Diagnostics: Engage Console

Press the Select Workout

Triple tap



in one second intervals

Upper RT corner



Entering Diagnostics: Integrated LCD

Touch the screen.



Triple tap the LF round logo in one second intervals (upper right-hand corner).

Note:

Diagnostics of the Integrated LCD consoles are very similar to the Elevation series console. Data Cannot be exported to USB.



Diagnostics Map – but only those that matter to us in the Field



- » System Test (8 states to learn out of 9)
- » Information (5 states to learn out of 11)
- » Configuration (4 states to learn out of 9)
- » Maintenance (a single state with no sub-states)

About the scheme coloring that follows in the next few slides:

Green = diag state exists in all LCD consoles

Gray = diag state not in 7- and not in 12.1-inch consoles

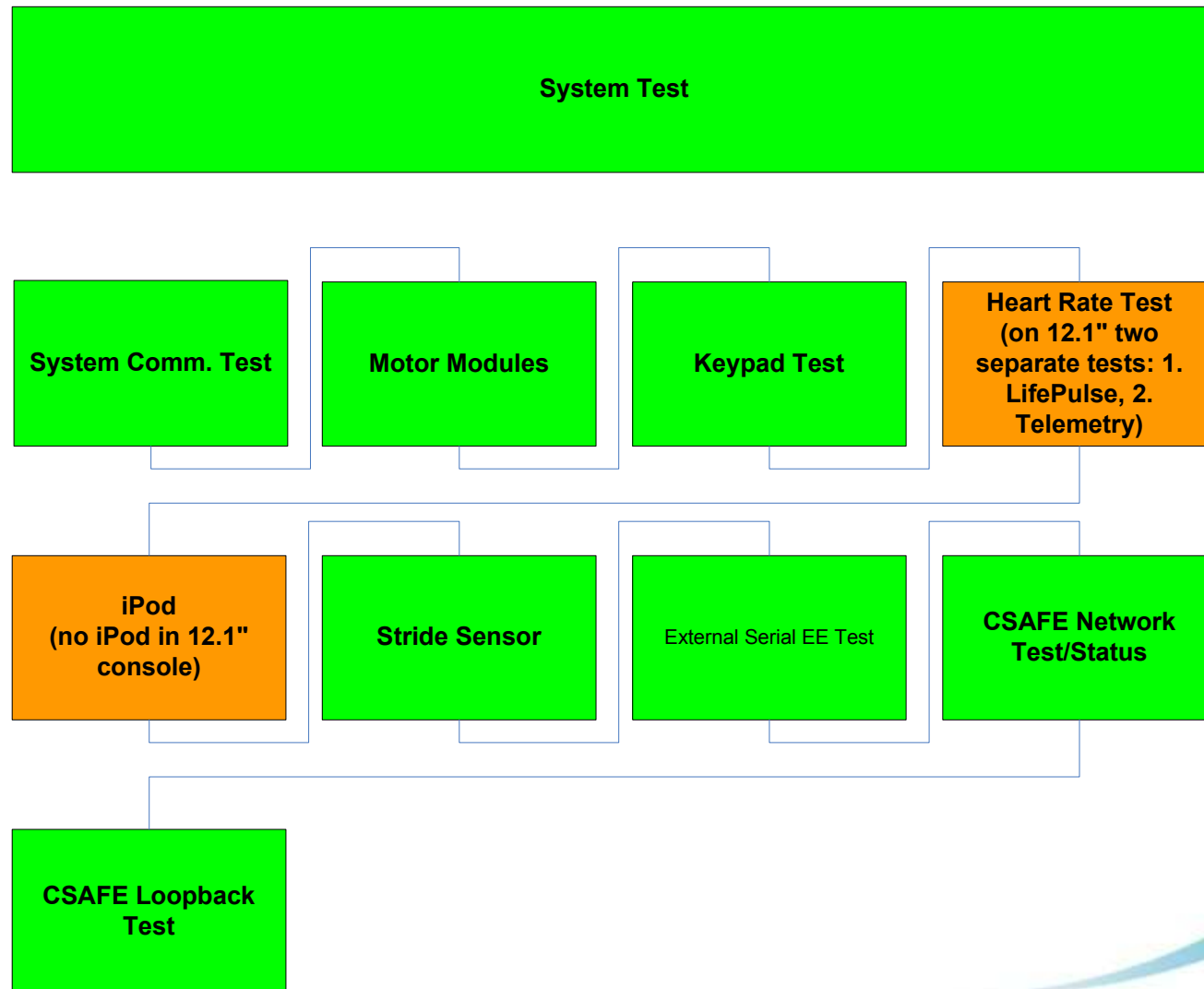
Orange = diag state does not exist on the 12.1-inch console

Red = diag state is so different that it needs to be discussed separately

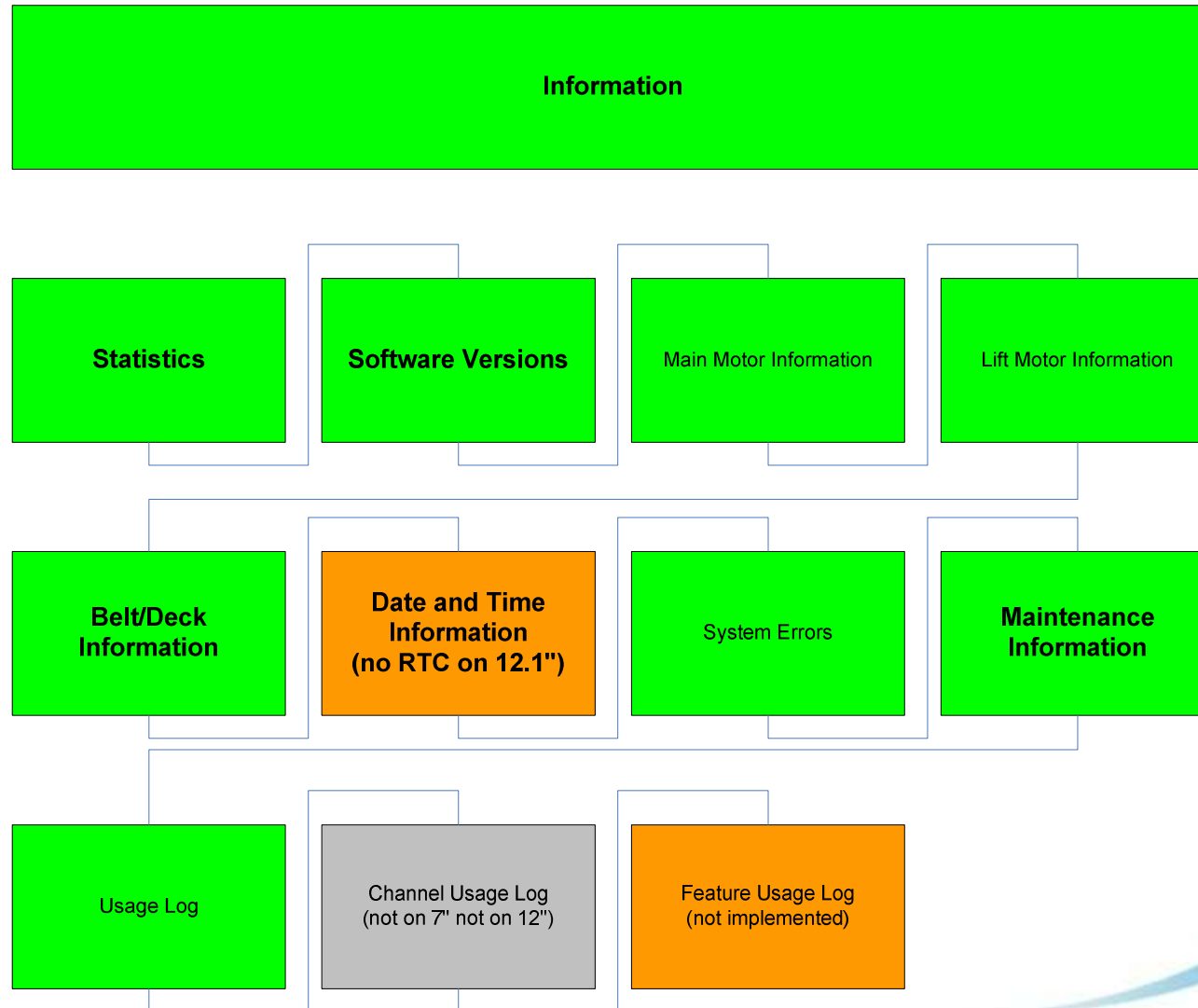
NOTE:

Non-treadmill's System Diagnostics module of System Test Menu needs to be discussed separately.

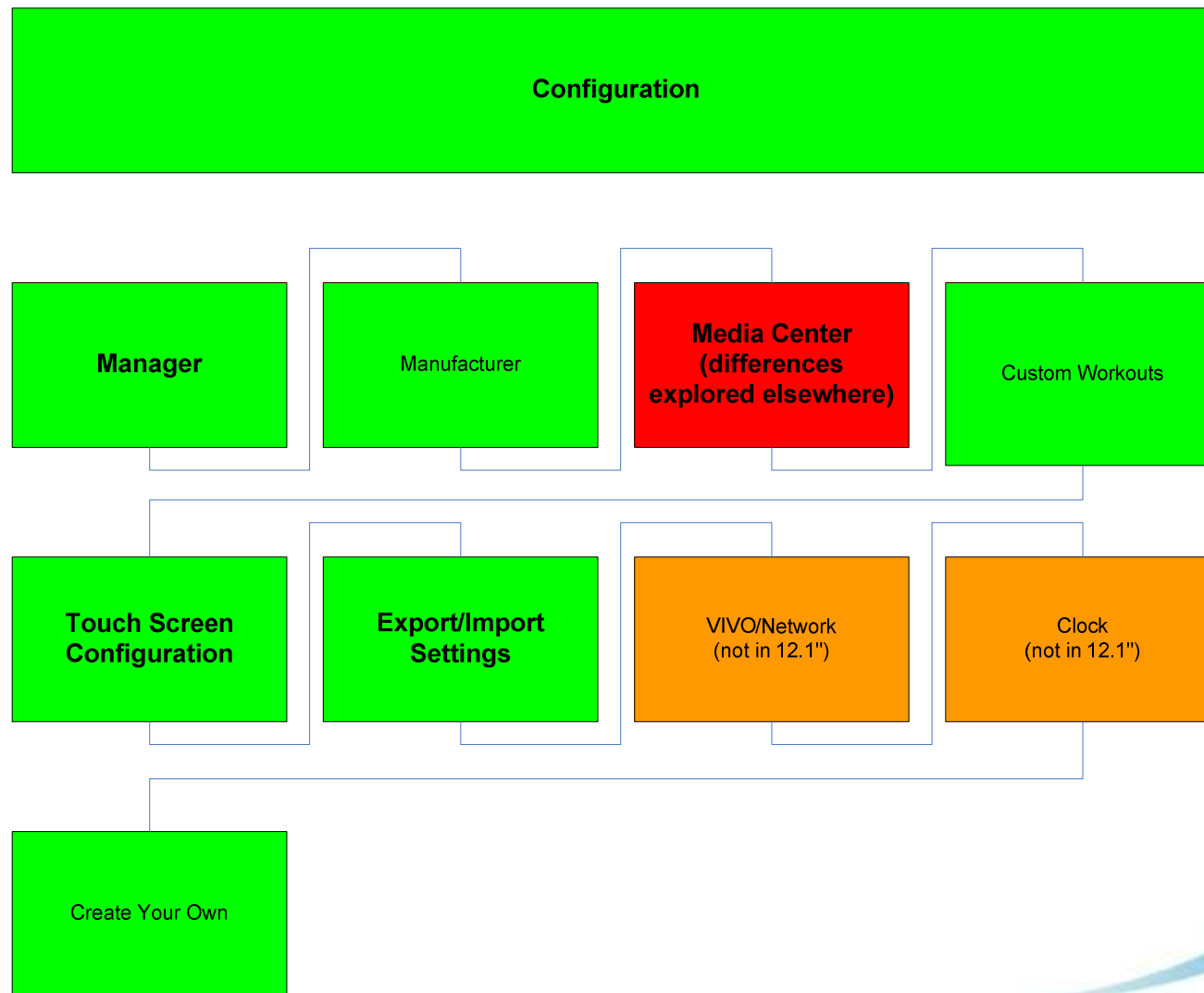
Diagnostics Map – System Test



Diagnostics Map – Information



Diagnostics Map – Configuration



Diagnostics Map – Maintenance

Maintenance

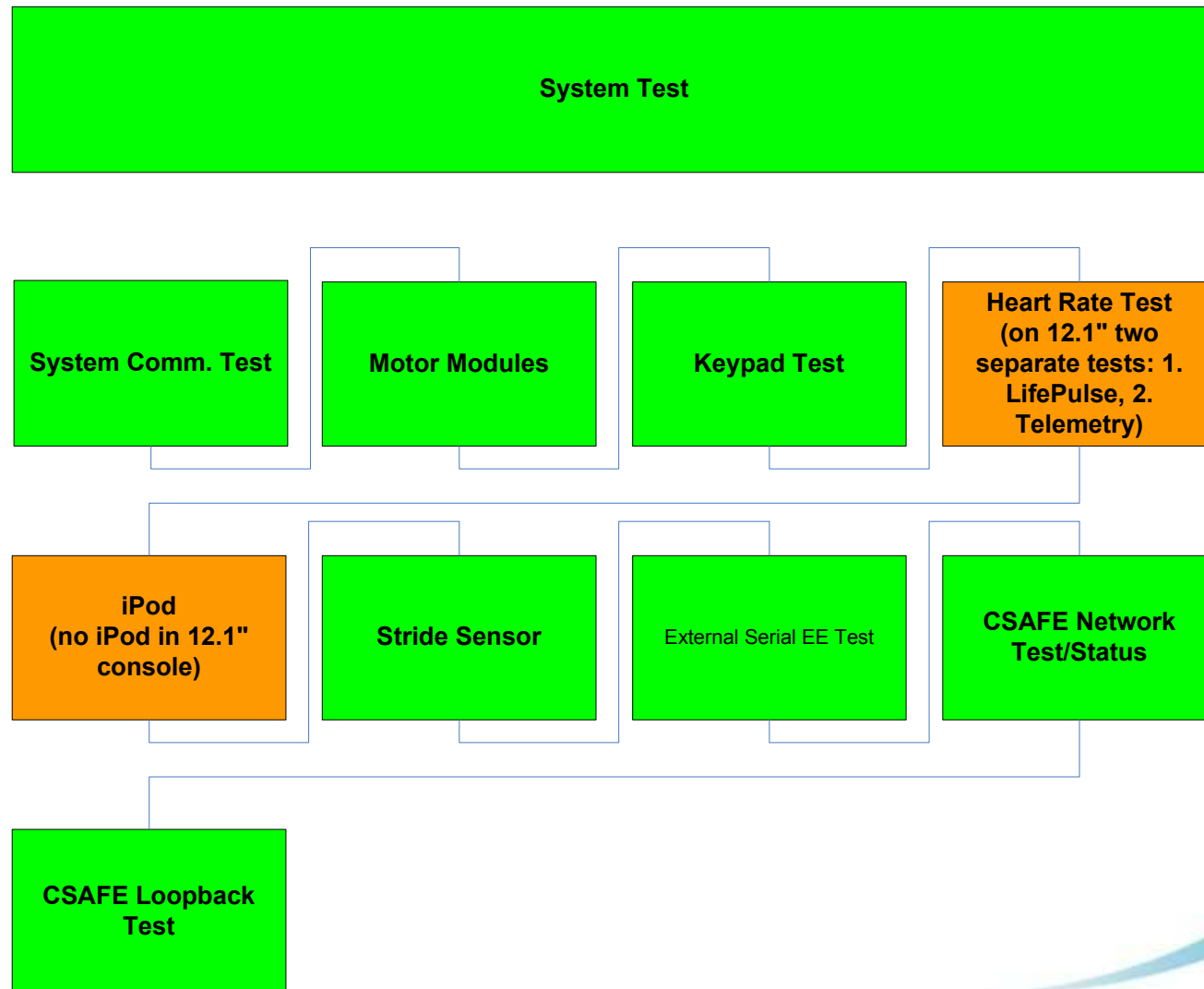
By virtue of choosing an option specify which repair was done on the console:

- * Replacing Belt and Deck
- * Replacing Console
- * Replacing Motor Controller
- * Replacing Wax/Lift Board
- * Replacing Stop Switch
- * Replacing Overlay Bezel
- * Replacing Main Motor
- * Replacing Lift Motor

Description of **System Test** Diagnostic States – a detailed overview

- » Let's take a look at the map of the System Test section of diagnostics
- » We will discuss:
 - ◆ System Comm. Test
 - ◆ Motor Modules
 - ◆ Keypad Test
 - ◆ Heart Rate Tests
 - ◆ iPod Test
 - ◆ Stride Sensor Test
 - ◆ CSAFE Network Test/Status
 - ◆ CSAFE Loopback Test
- » The graphical depiction is shown below (items in bold font type are the ones listed above)

Diagnostics Map – System Test



Description of **System Test** Diagnostic States

» System Comm. Test

- ◆ Detects all modules connected on the communication bus by polling them and receiving an acknowledgement
- ◆ Tip(s):
 - > Make sure that all of the modules had been detected (for example: a motor controller, lift system, serial EEPROM)
 - > Make sure that a message "System Comm OK!" or similar is displayed on the screen

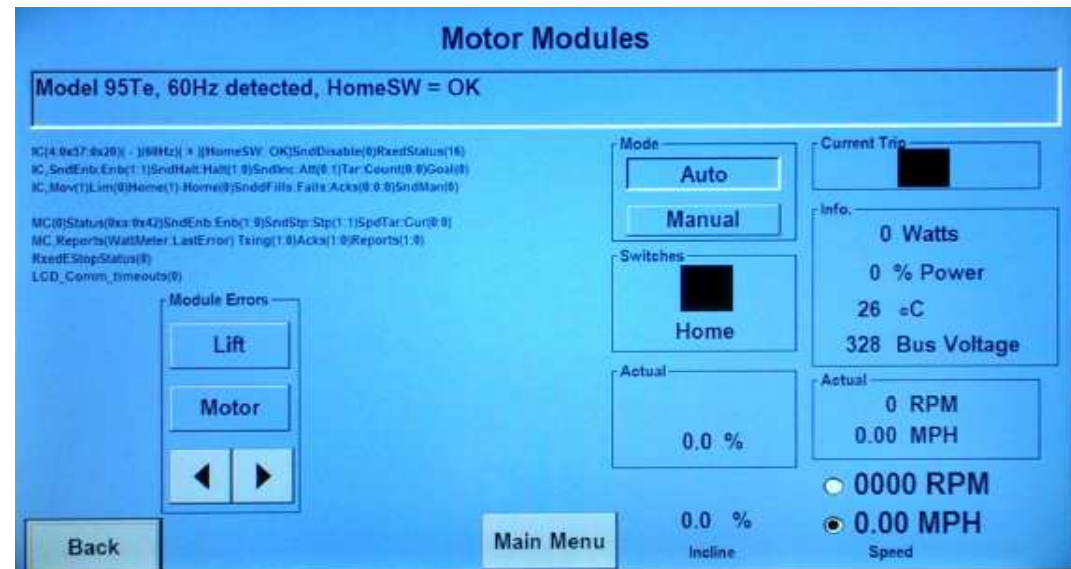
Description of **System Test** Diagnostic States (cont.)

» Motor Modules

- ◆ Displays Lift and Motor Modules' error messages
- ◆ Displays console's temperature
- ◆ Switch between Manual and Automatic Modes (related to Incline and Drive Motor testing)
- ◆ Indicates is a Current Trip occurred
- ◆ Displays Information on:
 - > Watts
 - > % power
 - > IGBT's temperature
 - > Bus Voltage
- ◆ Displays Actual vs. Commanded RPM
- ◆ Displays Actual vs. Commanded Incline

System Test: Motor Modules – a closer look at the diagnostic state

- » Perform the Belt / Deck Test
- » Monitor the Watts
- » % of Power
- » Bus Voltage
- » Speed info



- » Notes:
 - ♦ **Watts:** displayed for development only
 - ♦ **% Power:** if over 100%, power folding occurs
 - ♦ **Temp in C:** this is the IGBT's temperature, if temp ≥ 90 then power folding, at 100 degrees C complete shutdown.

Description of **System Test** Diagnostic States (cont.)

» Motor Modules (cont.)

◆ Tip(s):

- > Run the motor, walk on the belt/deck
- > Make sure that the following are within the constraints mentioned above:
 - % power
 - IGBT's temperature
 - Bus Voltage
- > Check for any errors related to the incline and drive systems

◆ Displays Actual vs. Commanded Incline

Description of **System Test** Diagnostic States (cont.)

» Keypad Test

- ◆ Displays a key code after a key press often with some diagnostic information

» Heart Rate Test (Polar and Telemetry)

- ◆ For the Polar test:
 - > Displays a telemetry heart rate value
- ◆ For the LifePulse® test:
 - > Displays the status of the hands: left/right on/off
 - > Displays the heart rate value
 - > Displays Confidence (0-9)
 - > Gain (0-99)
 - > Allows to control speed and incline

Description of **System Test** Diagnostic States (cont.)

» iPod Test

- ◆ Shows a status of:

- > The iPod being plugged in or unplugged
- > The iPod coprocessor (CP) detected or not

Note:

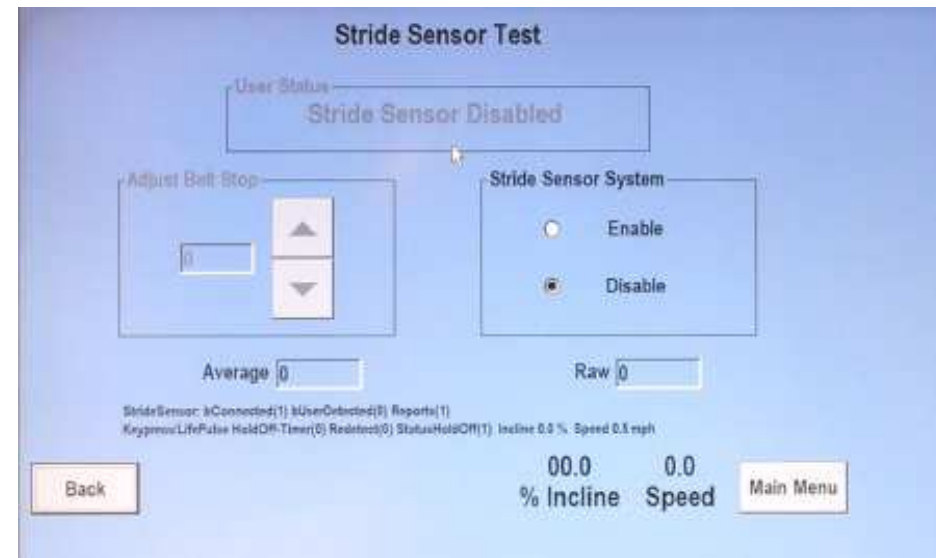
The CP is used to unlock full iPod communication protocol functionality necessary to control an iPod from the console.

» Stride Sensor

- ◆ Shows the status of the stride sensor
- ◆ Allows to enable and disable the stride sensor functionality

System Test: Stride Sensor Test

- » User Status
- » Adjust Belt Stop – set to zero
- » While performing a test walk on unit:
 - ◆ Avg: 51 = default state
 - ◆ Avg: 62 and below = no user
 - ◆ Avg: 63 and above = user sensed



Description of **System Test** Diagnostic States (cont.)

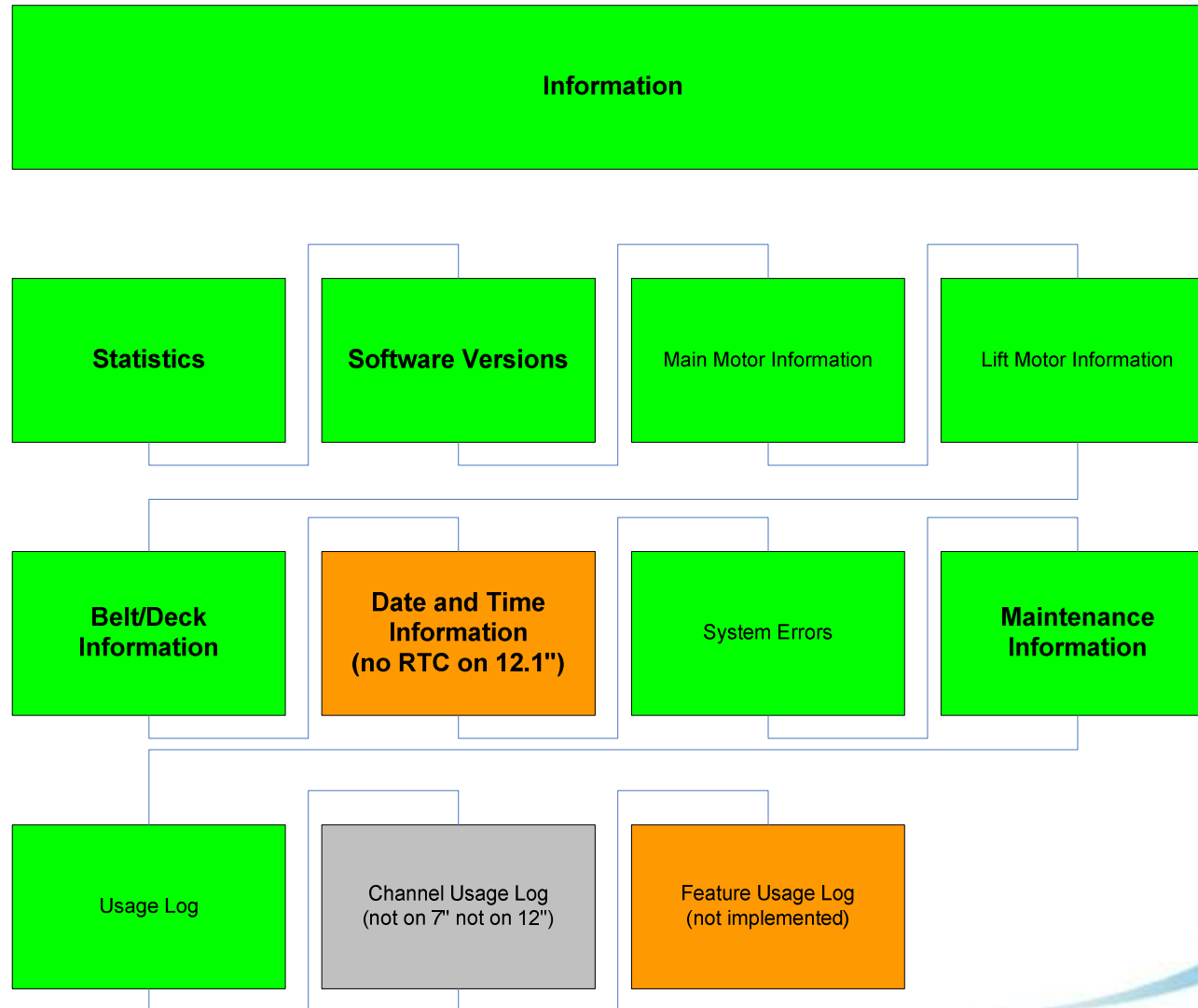
- » CSAFE Network Test/Status
 - ◆ Displays network diagnostic information
 - ◆ Displays product configuration
 - ◆ Displays CSAFE version
 - ◆ Allows to reset connection to the CSAFE network
- » CSAFE Loopback Test
 - ◆ Sends test packets to the CSAFE port and by virtue of having a loopback cable connected to the CSAFE port the system receives the test packets
 - ◆ Displays test results

THIS CONCLUDES THE SYSTEM TEST PART OF THE PRESENTATION

Description of **Information** Diagnostic States – a detailed overview

- » Let's take a look at the map of the Information section of diagnostics
- » We will discuss:
 - ◆ Statistics
 - ◆ Software Versions
 - ◆ Belt/Deck Information
 - ◆ Date and Time Information
 - ◆ Maintenance Information
- » The graphical depiction is shown below (items in bold font type are the ones listed above)

Diagnostics Map – Information



Description of **Information** Diagnostic States

» Statistics

◆ Displays:

- > Total hours
- > Total miles
- > Belt hours
- > Belt miles
- > Lift hours
- > Number of times a specific program selection occurred

Description of **Information** Diagnostic States (cont.)

» Software Versions:

◆ Displays:

- > Base serial number (SN)
- > Console SN
- > Console Version and Part Number
- > Motor Version and SN
- > LifePulse® version
- > CSAFE version
- > Interface Boot Version
- > Interface Board Version and Part Number
- > Console Boot Version
- > Apploader Version
- > Media Manager Version

Description of **Information** Diagnostic States (cont.)

- » Belt/Deck Information
 - ◆ Total Treadmill Hours
 - ◆ Total Treadmill Miles
 - ◆ Belt Hours
 - ◆ Belt Miles
 - ◆ Event History
- » Date and Time Information
 - ◆ Displays current date and time (cannot set it from here, see Configuration Menu >> Clock)
- » Maintenance Information
 - ◆ Displays system repair history

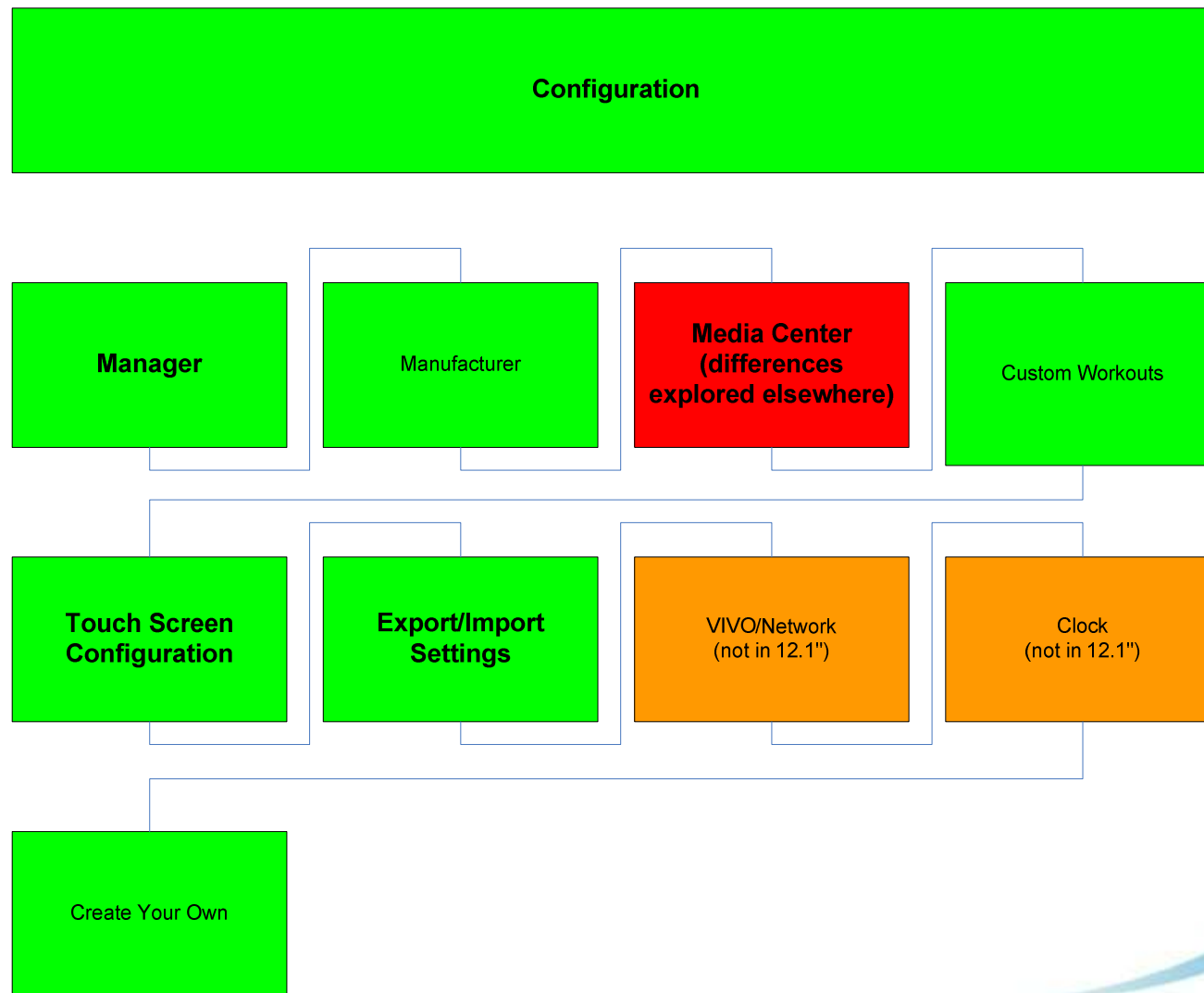
Tip(s):

Always make sure that the clock is properly set – a few things depend on it: Auto on/off, Advanced workout duration configuration,

Description of **Configuration** Diagnostic States – a detailed overview

- » Let's take a look at the map of the Information section of diagnostics
- » We will discuss:
 - ♦ Manager Configuration
 - ♦ Media Center
 - ♦ Touch Screen Configuration
 - ♦ Export/Import Settings
- » The graphical depiction is shown below (items in bold font type are the ones listed above)

Diagnostics Map – Configuration



Description of **Configuration** Diagnostic States

» Manager Configuration

- ◆ Allows to set up convenience and control items, for example:
 - > Default language
 - > Default units (English/metric)
 - > Max. Speed / Min. Speed
 - > Max. Workout Duration (general as well as during the peak and non-peak times)
 - > Stand by Configuration / Inactivity Timer
 - > Many other settings that might be useful to a club owner

Tip(s):

Max and Min. Speed settings are important in facilities where older people use our equipment – make sure that the speed settings are set to what they were prior to making an update.

Description of **Configuration** Diagnostic States

- » Media Center (as it's known on the 15" display)
Note:
On the 7" it is known as Attachable
On the 12.1" it is known as TV/FM Radio
Read the manual to learn more details regarding this diagnostic state
- » Touch Screen Configuration
 - ◆ Allows to calibrate touch screen
- » Export/Import Settings
 - ◆ Allows to export/import settings (On the 7- and 15-inch displays: all settings, TV and Radio only, Custom Message only – on the 12.1" Integrated LCD consoles only two options are available)

Note:

This diagnostic state should help you in cloning our equipment: set up once, propagate to to all

Description of **Maintenance** Diagnostic State – a detailed overview

- » This diagnostic state is an exception from the root diagnostic states – it does not have any substates. Also, it exists on Treadmill products only
- » We will discuss the purpose of this state
- » The graphical depiction is shown below (items in bold font type are the ones listed above)

Diagnostics Map – Maintenance

Maintenance

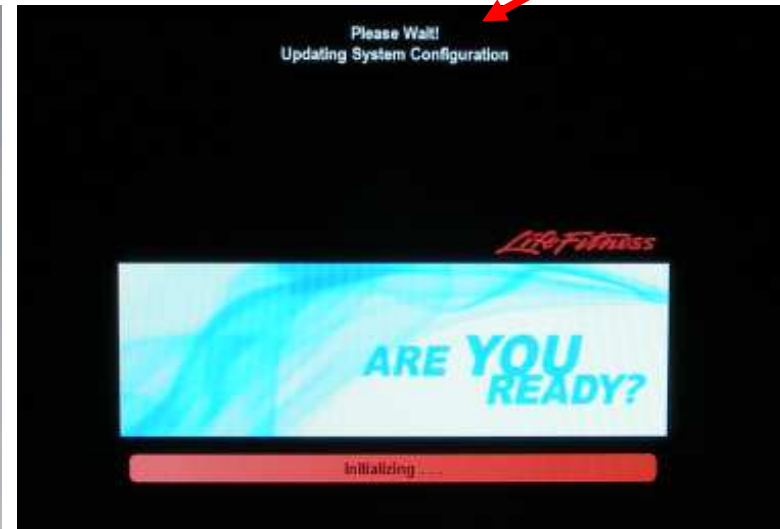
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- * Replacing Main Motor
- * Replacing Lift Motor

Purpose of **Maintenance** Diagnostic State

- » To log a repair or repairs being performed on the equipment for ease of reference
- » Note:
Always log a repair being performed!

Recording a Repair



- » The console will then confirm replacement.
- » Press the **"OK"** button again. The screen will go completely grey. Allow the console up to 60 seconds to reinitialize. If the screen remains blank for more than 60 seconds, turn the treadmill off and back on.
- » When the treadmill is on again. The console will beep once then three times. The **"Are You Ready?"** screen will appear. A **"Please Wait! Updating System Configuration"** message may also appear.

Conclusion to Diagnostics

- » We had talked about diagnostics in light of the LCD Console.
- » Many of the same diagnostic states exist on the LED treadmills
- » An excellent reference to diagnostics is a service manual of the respective product
- » In addition to the service manual, Life Fitness had developed a PC application that allows you to familiarize yourself with the systems' diagnostics by running the application on your computer – this application will be discussed next

Simulation of Diagnostics on a PC/Laptop

- » The simulation program was written by Life Fitness.
- » Use it to get to know our consoles better.
- » Feel free to use it before you go on the job site.
- » You can get it from <https://lftechsupport.com> >> Software Releases >> Engage and Inspire >> Desktop Demo
- » Limitations:
 - ◆ Any diagnostic states related to specific hardware will not work – this hardware does not exist on the PC.
 - ◆ You will have to master some of the diagnostic states on the product itself.

Summary

- » In this presentation we had discussed the following subjects:
 - ◆ We talked about diagnostics in general: purpose, getting in, navigating
 - ◆ We introduced the notion that diagnostics are supposed to be used from the system's point of view
 - ◆ We discussed common diagnostic states that exist in majority of Life Fitness products
 - ◆ We discussed product specific diagnostic states that can be used in troubleshooting of the specific functionality

Questions





THANK YOU!

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