Introduction

The diagnostic functionality that is built into the software supports the products listed below:

- CLSX
- CLSXH

The console diagnostics are very similar in function and appearance from one model to the next.

The Integrity non-treadmill products contain the following services:

- Information
- Optional Settings
- Manufacturer's Configuration
- Test/Service Menu

Entry into the menus is accessible by a special key sequence.

Entry into diagnostics is possible from the Attract / Program Select State by pressing and holding down the '5' key on the numeric keypad while initiating a system reset via pressing and releasing the CLEAR key twice.

The '5' key must continue to be held until the system enters the Information Menu State.
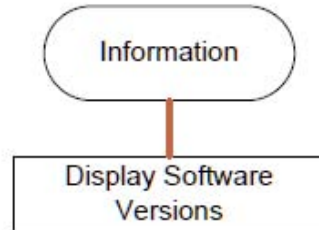
Once in diagnostics the following key combinations must be used to get to the above-listed diagnostics.

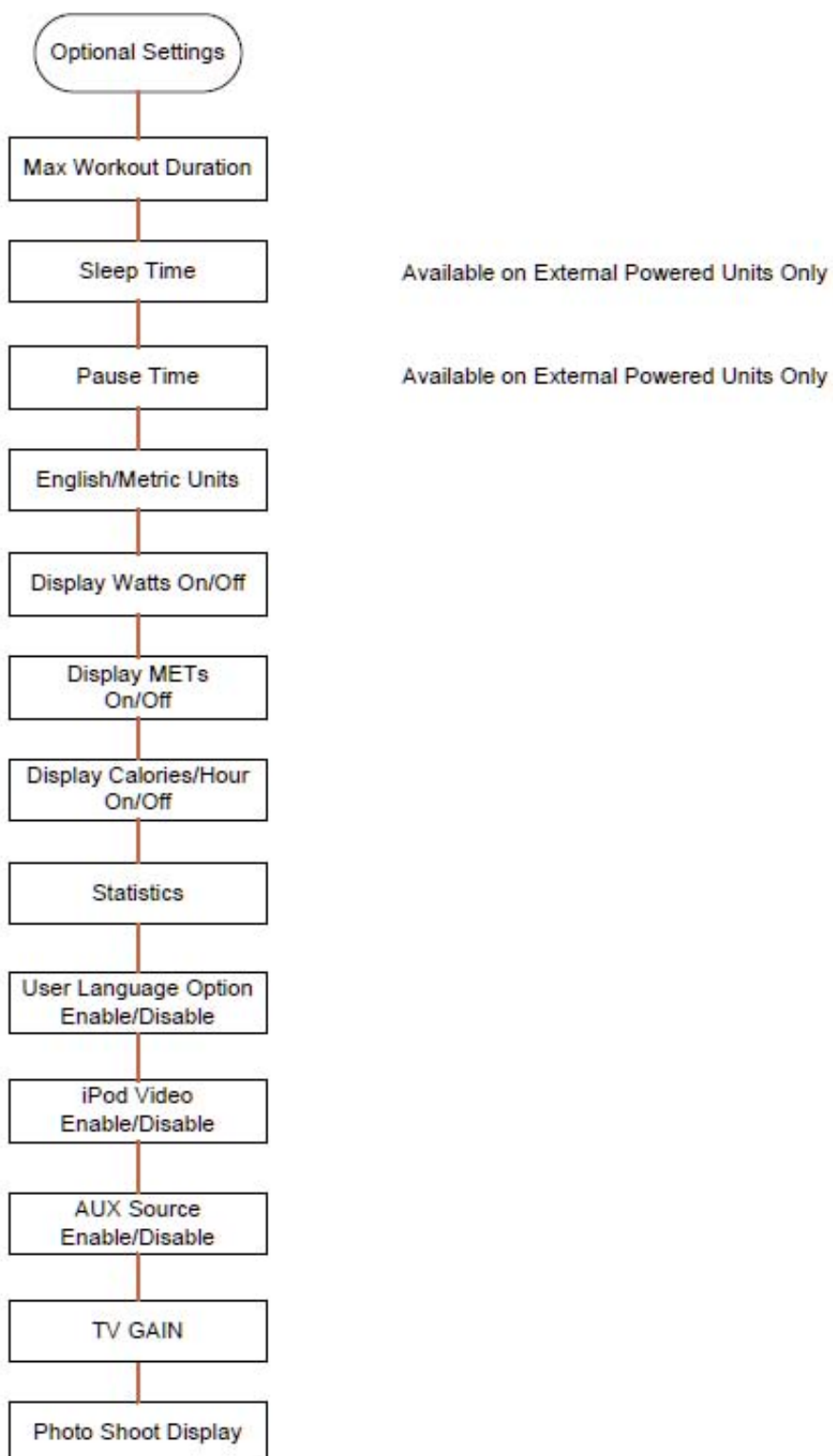| Diagnostic State Name	Key Combination to Enter the Diagnostic State
Information	In the Attract/Program Select state: Press and hold '5' key on the numeric keypad (not TV) initiate reset by pressing and releasing the CLEAR key twice within two seconds KEEP ON HOLDING THE '5' key UNTIL DIAGNOSTICS ENTERED.
Optional Settings	In the Diagnostic state: Press the ENTER key.
Manufacturer's Configuration	RESTRICTED
Test/Service Menu	In the Diagnostic state: Press the COOLDOWN key and while holding it depressed, press the ENTER key.

Information Menu

Product contains an Information State menu containing a specific set of Diagnostic utilities and/or display information. Upon entry to this menu the arrow keys are used for navigation through the list of utilities with the ENTER key selecting the current navigated to utility. The CLEAR key exits the current diagnostic utility or repeated pressing exits the Information Menu State.

INFORMATION FLOWCHART

```
        ┌─────────────────┐
        │   Information   │
        └────────┬────────┘
                 │
        ┌────────┴────────┐
        │ Display Software│
        │    Versions     │
        └─────────────────┘
```

Optional Settings Menu

Optional Settings

Max Workout Duration

Sleep Time — Available on External Powered Units Only

Pause Time — Available on External Powered Units Only

English/Metric Units

Display Watts On/Off

Display METs On/Off

Display Calories/Hour On/Off

Statistics

User Language Option Enable/Disable

iPod Video Enable/Disable

AUX Source Enable/Disable

TV GAIN

Photo Shoot Display

Max Workout Duration

This utility displays and allows the setting of a maximum workout duration time ranging from one (1) to 99 minutes. The default value is 60 minutes. This is used as the time limit for all workout programs except Marathon Mode. The Up/Down Arrow keys adjusts the currently displayed setting by 1 minute Up/Down respectively.

Pressing the Clear or Enter keys saves the currently entered/displayed configuration setting and exits this utility.

Sleep Time

This utility displays the current Sleep Time configuration setting and allows for the selection of a new Sleep Time configuration value. The Sleep Time configuration setting controls how long the console remains powered after either entering the Attract/Program Select State or from the last key press without having actively engaging the product in exercise. This configuration applies to externally powered products only and is not available otherwise. Upon entry to this utility the current configuration setting is displayed. The Up/Down Arrow keys allows incrementing/decrementing of the Sleep Time value in 1 minute increments respectively. The range of values for Sleep Time is 1 through 99 minutes and OFF.

Pressing the Enter or Clear keys saves the currently displayed configuration.

Pause Time

This utility displays the current setting of the Pause Timeout duration and allows for the configuration of a new Pause Timeout duration. The Pause Timeout duration controls the length of time the unit may stay in Pause Mode before exiting the Workout State. The range is between one (1) and 99 minutes. The Up/Down Arrow adjusts the currently displayed setting by 1 minute Up/Down respectively.

Pressing Clear or Enter keys saves the currently entered/displayed value and exits this utility.

English/Metric Units

This utility displays the current units setting and allows for the selection of a new units setting of either Metric or English units used for workout program data entry and information display. Note: changes in this configuration affect weight entry message and distance display. The Up/Down Arrow keys toggles the units selection. The Enter annunciator LED turns on when the displayed value is at the default setting.

Pressing the Clear or Enter keys saves the currently Selected/displayed configuration setting and exits this utility.

Display Watts On/Off

This utility displays the current Watts display setting and allows for the selection of a new Watts display setting (On/Off). The Watts enable setting controls the display of the "WATTS = XXX" message during a workout. The Up/Down Arrow keys toggles between the On and Off settings. The Enter annunciator LED turns on when the displayed value is at the default setting.

Pressing Clear or Enter keys saves the currently selected/displayed setting and exits this utility.

Display METs On/Off

This utility displays the current METs display setting and allows for the selection of a new METs display setting (On/Off). The METs enable setting controls the display of the "METS = XX.X" message during a workout. The Up/Down Arrow keys toggles between the On and Off settings. The Enter annunciator LED turns on when the displayed value is at the default setting.

Pressing Clear or Enter keys saves the currently selected/displayed setting and exits this utility.

Display Calories/Hour On/Off

This utility displays the current Cal/Hr display setting and allows for the selection of a new Cal/Hr display setting (On/Off). The Cal/Hr setting controls the display of the "CAL/HR = XXXX" message during a workout. The Up/Down Arrow keys toggles between the On and Off settings. The Enter annunciator LED turns on when the displayed value is at the default setting.

Pressing Clear or Enter keys saves the currently displayed setting and exits this utility.

Statistics

This utility displays a list of accumulated usage statistics collected for the product. Upon entry to this utility the first statistic is displayed in the message center by name along with its accumulated total.

Pressing the Up/Down Arrow keys advances through the list forward/backward displaying each statistic by name and accumulated total. Navigation through this list does not wrap. Pressing the Clear or Enter key exits this utility. The following statistics are reported for Integrity Cross Trainers:

Hours; Distance; Hill; Random; Manual; Fat Burn; Cardio; Aerobics Mode; Cross Train Reverse; Quick Start; Heart Rate Hill; Heart Rate Interval; Heart Rate Extreme; Preset Workout; Custom Workout; Air Force PRT; FIT Test; iPod Docks; iPod Audio Plays; iPod Video Plays

User Language Option Enable/Disable

This utility displays the current User Language Option setting and allows for the selection of a new User Language Option setting. The User Language Option setting controls whether the user must choose, before each workout, the language to be used in the workout. The Up/Down Arrow keys toggles between the Enable and Disable settings. The Enter annunciator LED turns on when the displayed value is at the default setting.

Pressing Clear or Enter keys saves the currently displayed setting and exits this utility.

iPod Video Enable/Disable

This utility displays the current iPod Video Enable/Disable setting and allow for the selection of a new iPod Video Enable/Disable setting (On/Off).

This feature allows control over allowing iPod video tracks to be played on the Attachable TV, if present. If enabled by selecting the On setting, and an iPod video track is selected, the video is routed to the TV. Otherwise, the video is not. The Up/Down Arrow keys toggles between the On and Off settings.

Pressing the Clear or Enter keys saves the currently selected/displayed configuration setting and exits this utility.

AUX Source Enable/Disable

This utility displays the current AUX Source Enable/Disable setting and allows for the selection of a new AUX Source Enable/Disable setting (On/Off). This feature allows control over whether or not an optional CSAFE Compatible audio device attached to the CSAFE connector is selectable as an audio source with the Source Select key (see section 3.3.11.3 Source Select Control of Keypad, Audio and Video).

If enabled by selecting the On setting, and the AUX audio input source is selected, the audio from that external device is routed to the console headphones. Otherwise, the AUX audio input source is skipped and not displayed in the source selections. The Up/Down Arrow keys toggles between the On and Off settings. Pressing the Clear or Enter keys saves the currently selected/displayed configuration setting and exits this utility.

TV GAIN

This utility displays the current setting of the TV Gain value and allows for the configuration of a new TV Gain value. The TV Gain value controls the dynamic range of the TV volume settings allowing quieter TV outputs to be amplified or stronger TV signals to be attenuated. The range of settings is between 0 and 7. The Up/Down Arrow keys adjusts the currently displayed setting by 1 increment Up/Down respectively. Pressing Clear or Enter keys saves the currently entered/displayed value and exits this utility.
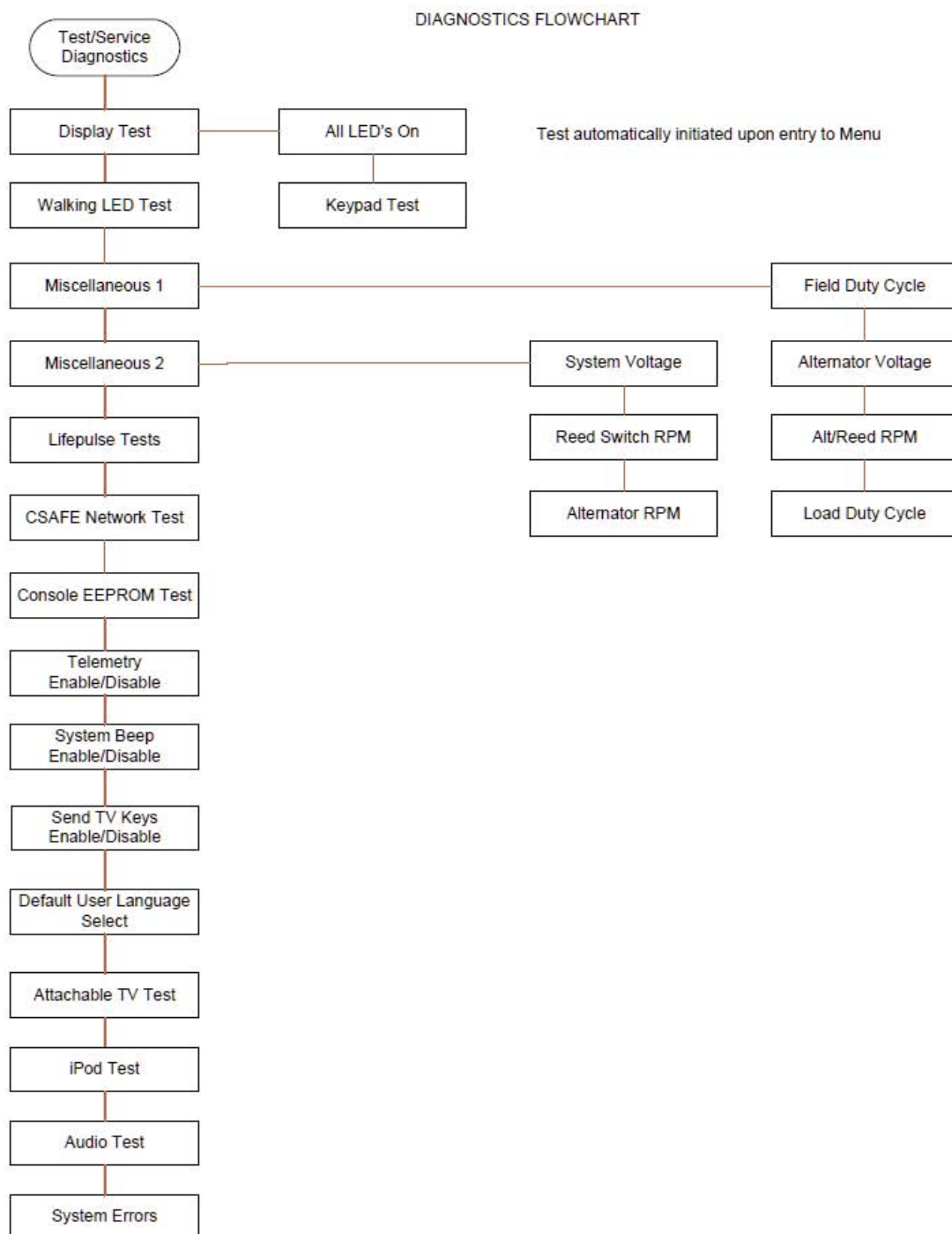
Photoshoot Display

This utility shows a static representation of the typical console displays during a workout program. It is to be used for photographic purposes. This utility does not time out and only exits when the Clear key is pressed. Information to be displayed includes is as follows:

- Heart Rate = 135;
- Distance = 1.09;
- Speed = 3.6;
- Calories = 205;
- Profile window showing the Heart Symbol;
- Time annunciator LED ON;
- Time window displaying 17:44

Test/Service Menu

The below illustration shows the map of the test/service section of diagnostics.

DIAGNOSTICS FLOWCHART

Display Test

The display and keypad functional tests are combined into one diagnostic utility whose default function is the ALL LED's on switching to the Walking LED display test and then to the Keycode Display test upon successive keypress (other than the Clear key).

All LEDs On

This test drives all annunciator and segmented LED displays fully on simultaneously for visual inspection.

Keypad Test

This test displays a string of characters in the message center display along with an audible beep corresponding to the key pressed. Multiples of similar keys with logical or functional meaning may display the same string. For example, the ENTER keys on both the upper and lower keypads for a Classic Series non-treadmill console may display the same string. Similarly, the numeric digit keys on both the iPod/TV and Numeric keypads may display the same string. Pressing the Clear, Start or Enter key exits the test and signifies correct operation of that key. Correct operation of the remaining keys is inferred from the corresponding visual display string and audible beep.

Walking LEDs Test

This test cycles through and illuminates all LED annunciators and display segments sequentially on a timed basis such that a faulty annunciator or display segment can be determined visually.

On entry to this state, the LED segments in the MESSAGE CENTER and the PROFILE WINDOW give the animated effect of moving, henceforth, 'Walking LED".

Segmented displays are activated first followed by individual LEDs.

Segmented displays when tested are activated by segment then by column. This sequence (individual LEDs on treadmills followed by segmented displays) continues until this state is exited.

Miscellaneous 1

TODO

Field Duty Cycle

This test displays a value representing the present Field Duty Cycle being applied to the alternator. This value is displayed in the Heart Rate Window. This value ranges from 0-255.

Alternator Voltage

This test displays a value representing the present alternator output voltage. This value is displayed in the Distance Window.

Alt/Reed RPM

This test displays a value representing the present alternator RPM. This value is displayed in the RPM window.

Pressing the .0. key toggles the RPM display between the alternator RPM and Reed Switch RPM. The Enter LED is ON when alternator RPM is displayed. RPM from the reed switch is not displayed when the alternator is running.

Pressing the .5. key toggles the alternator ON and OFF.

Load Duty Cycle

This test displays a value representing the present Load Duty Cycle being applied to the alternator. The value is displayed in the Calories window. Load duty cycle ranges from 0-250. This value can be adjusted using the TIME UP and Time DOWN Arrow keys.

Miscellaneous 2

TODO

System Voltage

This test displays a value that represents the present system voltage (Vsys) supplied to the console by the alternator. This value is displayed in the Heart Rate Window.

Pressing the .5. key displays the value of Vsys at startup, before the alternator is turned ON as an indication of the battery voltage. Note: This voltage will be slightly lower than if you read the voltage of the 6Vbattery directly from its terminals.

Reed Switch RPM

This test displays a value representing the present reed switch RPM. The value is displayed in the SPEED window on Cross Trainers.

Alternator RPM

This test displays a value representing the present alternator RPM. The value is displayed in the RPM window.

Life Pulse Tests

Upon entry to this test a heart-shaped image is displayed in the profile window along with a sequence of two messages in the message center. The first message identifies the LifePulse software version number. A second message followes automatically displaying confidence and gain terms as described below.

Term	Description
GAIN	The value displayed (from "0" - "99") is proportional to the amount of signal that is being provided by the Lifepulse sensors. The higher the gain value, the lower the signal being evaluated by the Lifepulse system.
CONFIDENCE	The reading (from 0-9) indicates a confidence level for the displayed heart rate. 0 = Low confidence, 9 = High confidence

During display of the second message the LifePulse system is ready to be manually tested.

When both hands are detected on the sensors, the letters "L" and "R" are displayed in the profile window along with the heart-shaped image. For 4-Wire Lifepulse systems only, an "L" is displayed when the left hand is on the sensor, and an "R" is displayed when the right hand is on the sensor. Two timers will begin counting from the time both the left and right hands on condition occurs. The first timer located on the upper console message center display, stops counting when LifePulse computes and displays an initial peak detected heart rate reading. The second timer located on the lower console display window for non treadmill products and on the message center for treadmill products, continues counting until LifePulse can reliably display the users heart rate. These timer readings are used for reference only.

The gain value corresponding to the heart rate signal is displayed in the message center following the character "G". The value ranges from 0 to 99. A gain value of 99 is considered to be high and undesirable. A gain value of 0 is considered to be low and also undesirable. Gain values of between 15 and 40 are considered normal depending upon whether the user is exercising or standing still during this test.

The confidence value corresponding to the heart rate signal is displayed in the message center following the characters "C-". A confidence value of 0 is considered a low confidence reading while a reading of 9 is considered a high confidence reading. Other values from 1 to 8 reflect intermediate intervals of ascending confidence readings.

The Level is adjustable during the test using the Level Up/Down keys. The profile window shows a relative indication of level.

CSAFE Network Test

This test exercises the CSAFE communications port by sending and responding to CSAFE commands with a Fitlinxx network device while establishing a CSAFE Network connection.

Status of the overload detection circuit for this port is displayed in this diagnostic.

The network system is checked as follows:

1. Remain in the CSAFE Test Mode above (by not exiting out of if).
2. Make sure the network cable is plugged in.
3. Press the COOLDOWN key. This resets the console and send out the standard power up message to the network. The console displays .RESETTING NETWORK.. The power up message sent to the network is the same one the console sends every time it is turned on (or anytime it is used by a user on self-powered products).
4. If the network has received the CSAFE communication packet from the console and the network sends configuration communication packet to the console then console displays .RECEIVING.".
5. If the console has been properly configured by the network and is allowed to accept user ID's then the console shows .GETID MODE XX.. The .GETID. message indicates the product is in the get ID mode. This is the mode the network must put the console in, before it asks the user to enter in their ID. If the console is not put in this mode the console does not ask for ID's.
6. If the network does not respond to the console then console displays a .NOT CONNECTED. Message. This indicates a problem exists with the network cable or network itself. This means the console has not received any valid CSAFE communications from the network.

Console EEPROM Test

This test exercises the functionality of the Console EEPROM by reading, writing, and replacing all used locations in the Console EEPROM. The EEPROM location being tested is displayed in the message center. Pressing the DOWN ARROW key will initiate the EEPROM test. If the test completes successfully, the message EEPROM GOOD will appear. If the test fails, the message EEPROM BAD AT XX will display with the bad EEPROM location.

A special feature is available within this utility allows for the reset of the CONFIG items to their defaults. To initiate this process hold the "QUICK START" key and press "ENTER".

Telemetry Enable/Disable

This test requires a Polar compatible transmitter (chest strap or pulse simulator). TELEMETRY is capable of being turned ON or OFF within this state. The ENTER key LED indicates when the value is at the default setting of TELEMETRY ON. This value is stored in EEPROM and is kept when the unit is not in use. The DOWN ARROW turns OFF the telemetry. The UP ARROW turns ON the telemetry.

This test does not function if the telemetry setting has been turned OFF. A heart shape is displayed in the program profile window when TELEMETRY is turned ON.

If a telemetry heart rate is detected it is displayed in the message center when telemetry is set to ON.

System Beeps Enable/Disable

This utility displays the current System Beeps setting and allow for the selection of a new System Beeps setting (Enable on/Disable off). The System Beeps setting controls whether the system speaker beep is generated on key presses. The Up/Down Arrow keys toggles between the On and Off settings. Pressing the Clear key exits this utility with the current setting in effect.

Send TV Keys Enable/Disable

This utility displays the current Send TV Keys setting and allow for the selection of a new Send TV Keys setting (Enable/ Disable). This option controls whether the iPod/TV key press events are sent out via the CSAFE port to control CSAFE compatible devices. Pressing Up/Down Arrow keys toggles between the Enable and Disable settings. Pressing the Enter key saves the presently selected configuration.

Pressing the Clear key exits this utility with the current setting in effect.

Default User Language Select

This utility displays the currently selected Default User Language setting and allow for the selection of a new Default User Language setting to be used for all user messages and all Service Menu messages. The arrow keys scrolls forward/backward respectively through the list of languages. Scrolling past the last or the first language in the list wraps accordingly.

Pressing the Clear key exits this utility with the current setting in effect.

Attachable TV Test

This utility reports on the detection of the attachable TV. Upon entry to this utility the present status (Detected/Not Detected) is displayed and continue to be periodically updated at least once a second.

Pressing the Clear Key exits this utility.

iPod Test

This utility reports on the detection status of the iPod interface and Apple Authentication Chip as well as provide the ability to turn on/off the iPod power/charge circuit. Upon entry to this utility the status of the iPod detect circuit is displayed (Detected/Not Detected) on the message center. Pressing the Up/Down Arrow keys cycles through the display of additional status including iPod detect (Detected/Not Detected), iPod Accessory Power detect (Active/Not Active), iPod Power Error (Error/NoError), and iPod Authentication Chip detect (Detected/Not Detected). While in this utility the Enter key toggles the iPod Power Enable drive circuit turning it on and off. When pressed the message center temporarily displays the status of the Power Enable circuit (On/Off) and updates the presently displayed test status upon return. This allows effects in status due to changes in the power circuit

drive to be monitored. To avoid battery drain on self powered products the iPod Power Enable is not be left enabled for more than 10 seconds unless the product is being operated.

Pressing the Clear key exits this utility and disables iPod Power Enable.

Audio Test

This utility provides status and low level control of the audio device. Upon entry to this utility the message center displays the results of a low level communication status check indicating if the part is responding (i.e. a simple I2C Ack as a result of a poll indicates the device is communicating). If this initial communication status check failed, the message center reports the failure and no further tests are permitted. If successful, the device is configured to select the iPod audio input channel with a default volume setting of 50% of max range. Pressing the Source Select key cycles through the input channel selections in order (iPod, TV, AUX, and TV GAIN) and wrapping at the end. The active audio channel is the currently displayed audio selection. When the TV GAIN setting is active, temporary changes to the TV volume range is possible. In addition to the currently selected audio channel the message center displays its associated volume, or gain setting for TV GAIN. Pressing the Up/Down Arrow keys increases/decreases the setting by a minimum step supported by the device. When the TVGAIN is adjusted, the overall output volume range for the TV source is affected but not saved (see section TV Gain).

Pressing the Clear key exits this utility whether passed or failed.

System Errors

This utility displays the number of logged occurrences of each of the following monitored system events:

- VCardio Power Errors (VCAR-TRIPS)

Pressing the Up/Down Arrow keys scrolls forward/backward respectively through the list of errors. Scrolling past the last or the first error in the list wraps accordingly. Pressing the Clear key exits this utility.

Manufacturer's Configuration Menu

Direct navigation from the Service Menu State to the Manufactures Config State occurs by pressing and holding the COOLDOWN and QUICK START keys while pressing the ENTER key. It is possible to navigate out of the Manufacturers Config State proceeding to the Diagnostic Config State as shown. Direct navigation from the Service Menu State to the Optional Settings State occurs by pressing the ENTER key. It is possible to alternately enter the Optional Settings State by navigating through the Diagnostic Config State.

MANUFACTURES CONFIGURATION FLOWCHART

```
           ┌──────────────────┐
           │   Manufactures   │
           │  Configuration   │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Product Type Config │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │     Battery      │
           │ Selection/Detection │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Power Status Check │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Consumer Programs │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │    Lifepulse     │
           │  Enable/Disable  │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │    Stationary    │
           │ Programming Time │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Show CSAFE Audio │
           │     Messages     │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │    Power Save    │
           │ Enabled/Disabled │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Font Flash Checksum │
           │       Test       │
           └──────────────────┘
                    │
           ┌──────────────────┐
           │ Lifepulse Half Heart │
           │ Rate Lockout On/Off │
           └──────────────────┘
```