



COVIDIEN

ForceTriad Energy Platform

Customer Support

Calibration Procedure

Troubleshooting

System Service

Periodic Safety Check



Troubleshooting & Service Guide

Covidien Customer Support Contacts

Worldwide Service Centers



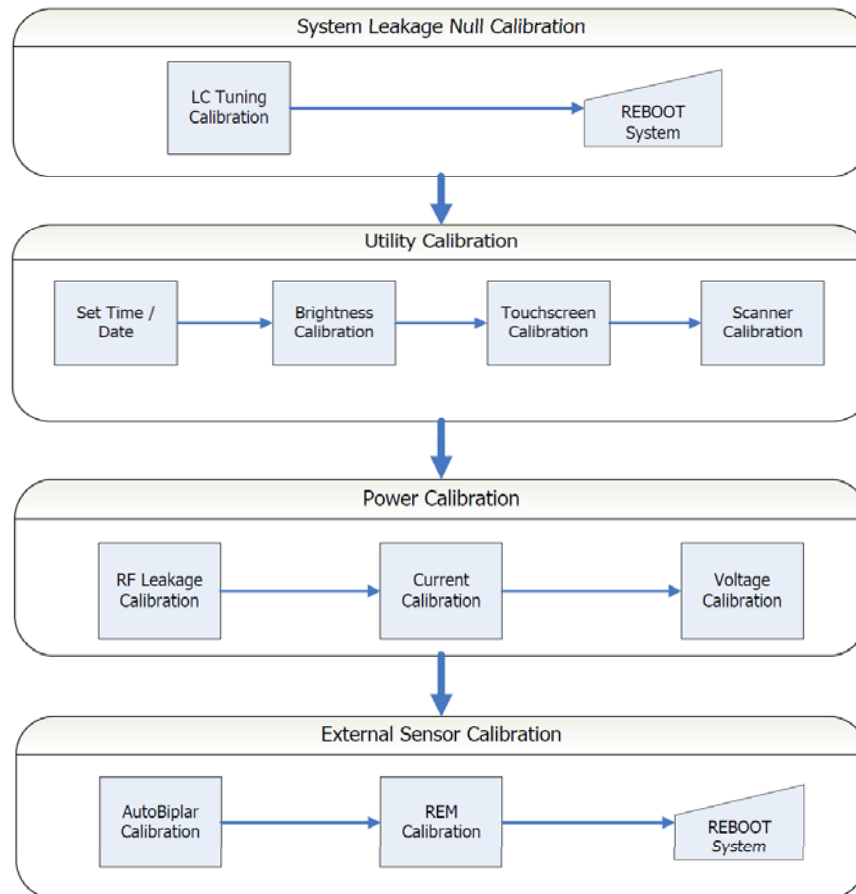
Click anywhere on the map to access the Covidien technical support website



Calibration Procedure

CALIBRATION PROCEDURE DEFINITION

The calibration procedure has been broken down into four different areas of calibration. The different calibration areas segregate the full calibration procedure into smaller, more manageable calibration sections. These sections are then selected based on the service performed. Additional information can be found by clicking on the flow chart below.



The different calibration levels defined below are the **MINIMUM** requirement of level of calibration to be performed. Ultimately, a full, level 6 calibration is preferred for all levels of service work completed.

The full calibration procedure definition, including a step-by-step procedure, can be found in the ForceTriad Service Manual. The information found in the Calibration Procedure section of this guide is for reference only.

Calibration Level Definition	
Calibration Level 0	No calibration required
	Periodic Safety Check required
Calibration Level 1	Scanner Calibration
Calibration Level 2	System Leakage Null Calibration
Calibration Level 3	System Leakage Null Calibration
	Utility Calibration
Calibration Level 4	Power Calibration
	System Leakage Null Calibration
Calibration Level 5	Power Calibration
	External Sensor Calibration
	System Leakage Null Calibration
Calibration Level 6	Full calibration required

System Leakage Null Calibration

The System Leakage Null Calibration process consists of adjusting the LC Tuning on the system. This is accomplished by using the equipment outlined below and using the touch screen menu navigating to the calibration section.

Main Menu → Service → Diagnostics → Debug Mode

The screenshot shows the calibration interface with the following elements:

- Control Panel (Left):**
 - Mode Selection: Mono Cut
 - Port Selection: Mono 1 Port
 - Open Or Closed Loop: Closed Loop
 - RF ON / Stop RF buttons
 - Level: 1 Watts
 - Navigation arrows and a back button.
- Parameter Table (Middle):**

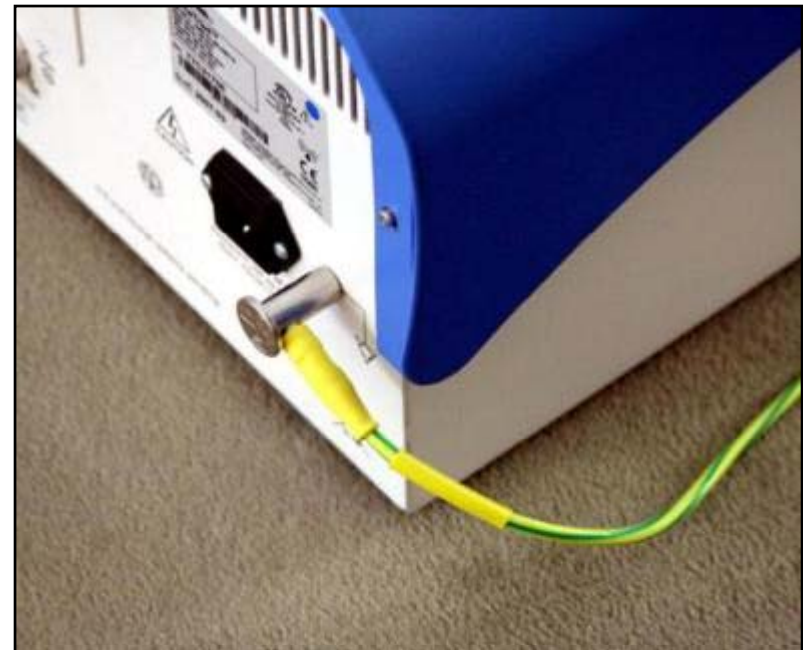
	Dsp1	Dsp2	Dsp1Avg	Dsp2Avg	C
PavgLd	0.000	0.000	0.000	0.000	(
VrmsLd	0.812	0.411	0.812	0.411	(
LrmsLd	0.0001	0.0000	0.0001	0.0000	(
Lkg	0.072	0.064	0.072	0.064	(
ZLoad	9736.1	9736.1	9736.1	9736.1	1
Vlφ	0.029	0.047	0.054	0.032	(
Pk I	0.001	0.000	0.001	0.000	(
Pk V	1.673	0.453	1.673	0.453	->
- Data Table (Right):**

	Data	Data Avg	Data StDv	
REM Voltage	4.413	4.414	0.000000	▲
REM Ω	198.762	198.783	0.000000	▲
HVPS Voltage	0.000	0.000	0.000000	▲
ABP Voltage	4.819	4.819	0.000000	▲
ABP Ω	5965.038	5964.388	0.000000	▲
AUD Sense	384.000	383.152	0.000000	▲
M1 Slider (hz)	381.476	381.476	0.000000	▲
M1 Button (hz)	381.476	381.476	0.000000	▲
M2 Slider (hz)	381.476	381.476		▲
M2 Button (hz)	381.476	381.476		▲

LC Tuning Setup Example

Item	Qty
Ground Lug Cable	1
D4 Cable with Current Probe	1
Current Monitor	1
REM Adaptor	1
#0 Flathead Screwdriver	1

LC Tuning Calibration Setup



Utility Calibration

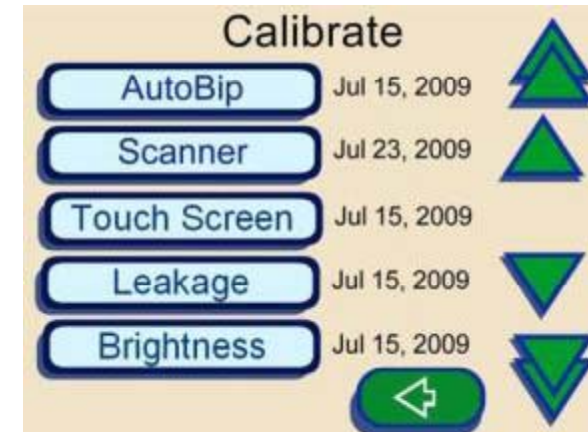
The Utility Calibration process consists of setting up the date & time, screen brightness, touch screen, and scanners on the system. This is accomplished by using the equipment outlined below and using the touch screen menu navigating to the calibration section.

TIME & DATE:

Main Menu → Setup → Time And Date

BRIGHTNESS, TOUCH SCREEN, & SCANNER:

Main Menu → Service → Maintenance → Calibrate → Brightness
Touch Screen
Scanner



Set Time & Date Example

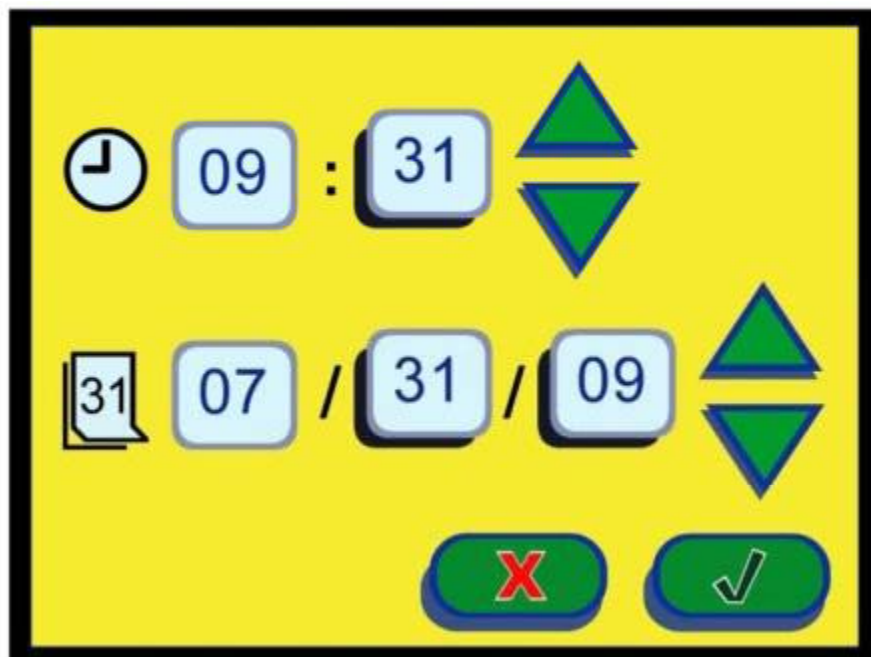
Brightness Setup Example

Touch Screen Setup Example

Scanner Setup Example

Item	Qty
Stylus (Optional)	1
Ligasure 1 Dot Code Instrument	1

Set Time & Date Setup



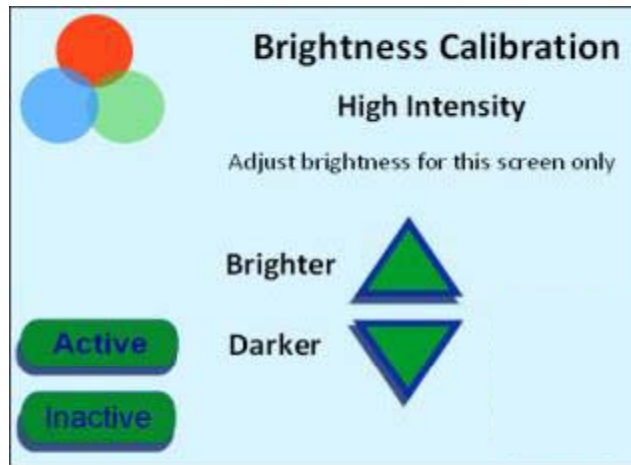
DATE & TIME SETUP PROCEDURE

Navigate the ForceTriad touch screen menu to "Setup", then "Time And Date" to the screen to the left. On this screen, use the green up and down arrows to set the date and time.

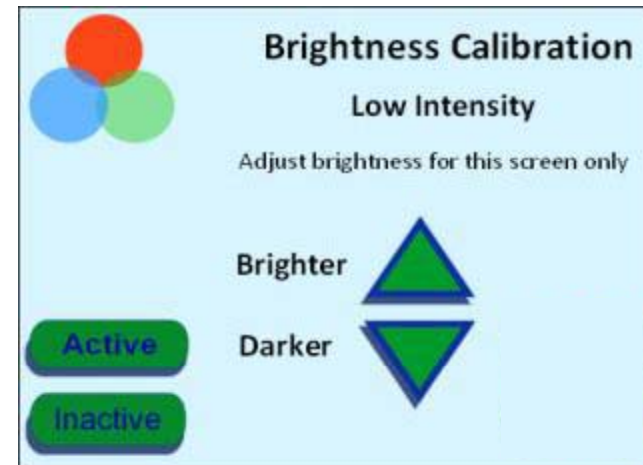
After completion of setting the date and time, select the green check mark to store the date & time.

Brightness Calibration Setup

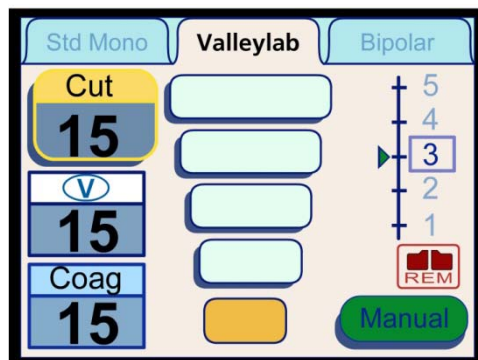
High Intensity



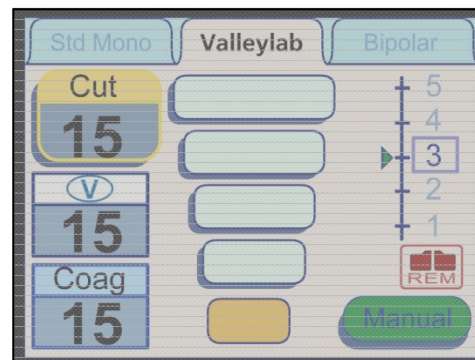
Low Intensity



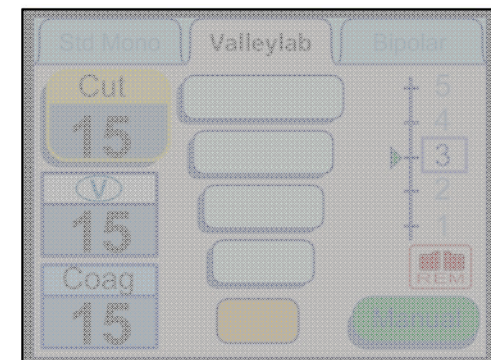
High Intensity



Low Intensity



Inactive Screen



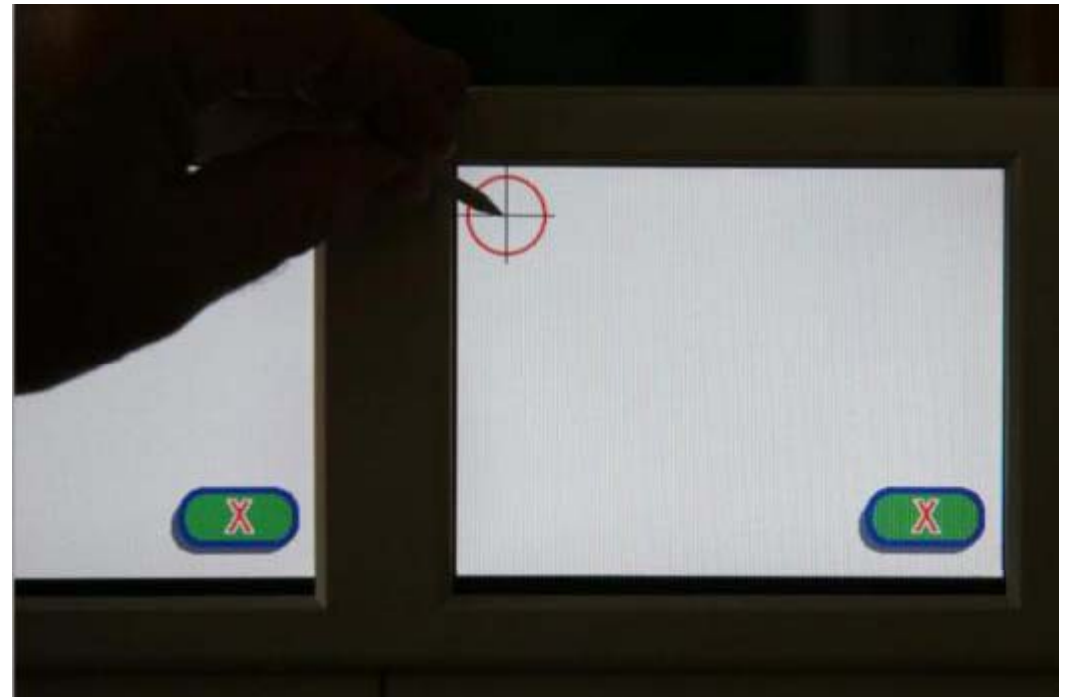
Touch Screen Calibration Setup

TOUCH SCREEN SETUP PROCEDURE

Under the "Calibration" section of the touch screen menu, select the touch screen calibration. You will be prompted to touch the crosshair icon on the screen.

Preferably using a stylus, begin touching the center mark of the crosshairs beginning with the left screen moving right.

Your finger tip is an acceptable alternative to the stylus.



Scanner Calibration Setup

Scanner Calibration

Performing initial scanner calibration on all ports.
Please wait for calibration to complete.
Cancel may leave scanners in unusable state.



SCANNER SETUP PROCEDURE

Under the “Calibration” section of the touch screen menu, select the scanner calibration. You will be prompted to insert dot code handsets.

Using appropriate hand pieces, insert the hand piece into the corresponding receptacles as prompted by the on screen commands.




Power Calibration

The Power Calibration process consists of measuring the RF leakage, current, and voltage on the system. This is accomplished by using the equipment outlined below and using the touch screen menu navigating to the calibration section.

Main Menu → Service → Maintenance → Calibrate → Leakage
 Current Cal
 Voltage Cal


Leakage Calibration

Attach a cable from the REM port to the ground lug on the rear chassis. Then connect measurement instrumentation to the cable.




Current Calibration

Offset is being measured.
 Press the "Right Arrow" to continue.



Voltage Calibration

Connect a 1K Ohms resistor to the Monopolar 1 output and attach RMS current measurement instrumentation.



RF Leakage Setup Example

Current Cal Setup Example

Voltage Cal Setup Example

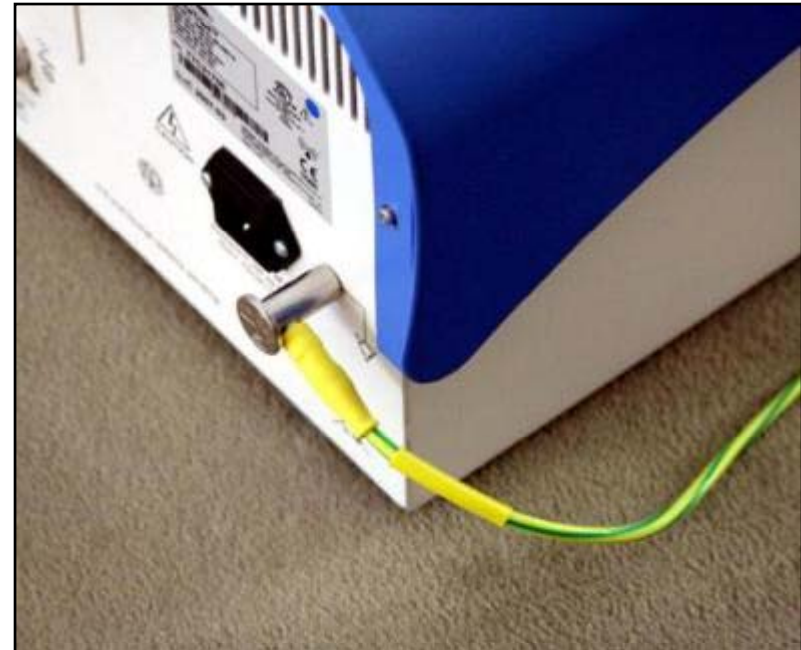
Item	Qty
Ground Lug Cable	1
D4 Cable with Current Probe	1
Current Monitor	1
REM Adaptor	1
Cable Lead	2
Resistors (1KΩ & 5KΩ - 250W)	1



WARNING: Do not hold down on the pushbuttons!



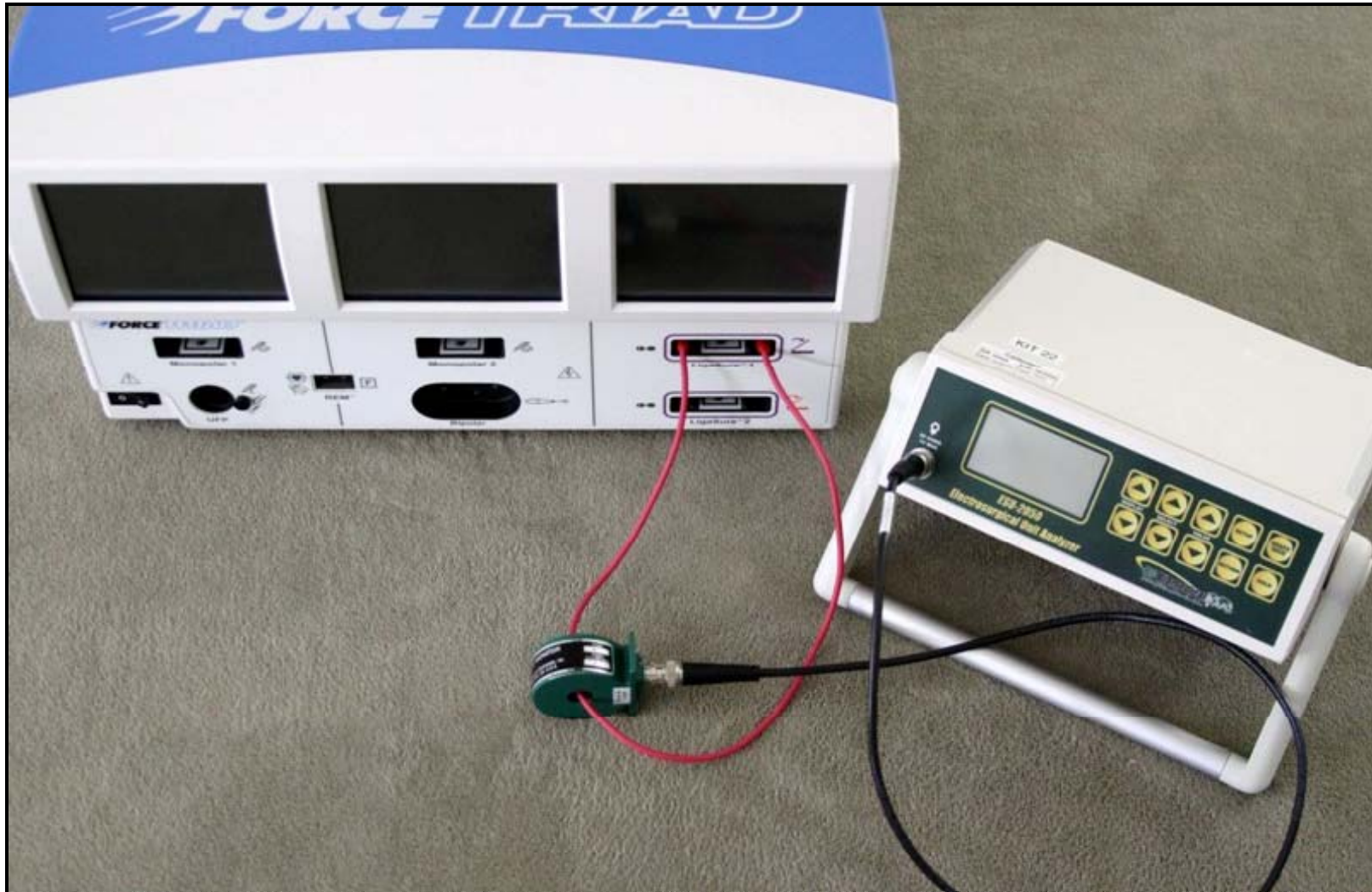
RF Leakage Calibration Setup



WARNING: Do not hold down on the pushbuttons!



Current Calibration Setup



WARNING: Do not hold down on the pushbuttons!



Voltage Calibration Setup



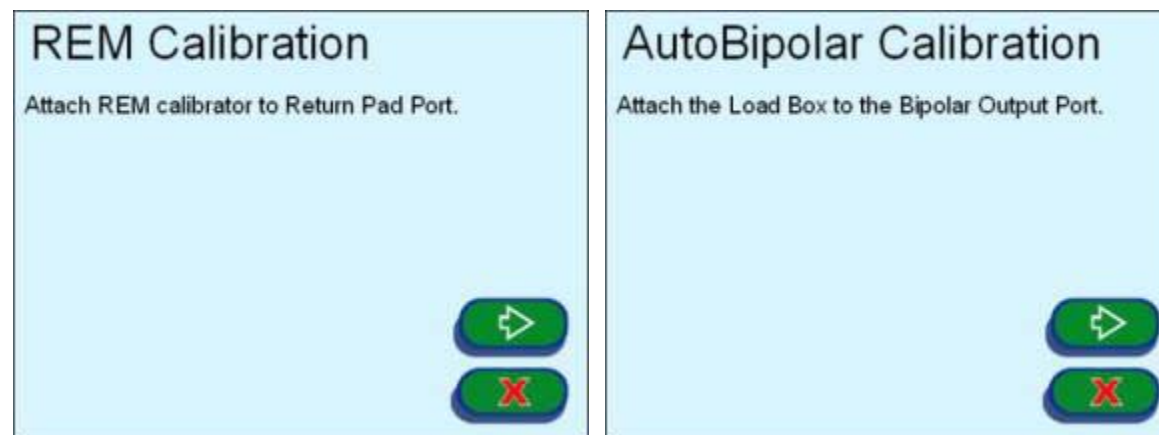
WARNING: Do not hold down on the pushbuttons!



External Sensor Calibration

The External Sensor Calibration process consists of measuring the REM and AutoBipolar settings on the system. This is accomplished by using the equipment outlined below and using the touch screen menu navigating to the calibration section.

Main Menu → Service → Maintenance → Calibrate → REM
AutoBip



AutoBipolar Setup Example

REM Setup Example

Item	Qty
REM Calibrator	1
Load Box	1
REM Calibration Cable	1
AutoBipolar Cable	1

Autobipolar Calibration Setup



REM Calibration Setup



Error Code Definition & Troubleshooting

E2	E11	E20	E258	E267	E276	E285	E294	E303
E3	E12	E21	E259	E268	E277	E286	E295	E304
E4	E13	E22	E260	E269	E278	E287	E296	E305
E5	E14	E23	E261	E270	E279	E288	E297	E306
E6	E15	E24	E262	E271	E280	E289	E298	E307
E7	E16	E25	E263	E272	E281	E290	E299	E308
E8	E17	E26	E264	E273	E282	E291	E300	E309
E9	E18	E27	E265	E274	E283	E292	E301	E310
E10	E19	E257	E266	E275	E284	E293	E302	E311

Non-Error Code Failures



Non-Error Code Troubleshooting

Gray Screens

The system responds to a power cycle and begins the system initiation. The three display screens show a blank, gray screen instead of displaying the white Covidien screen.

Black Screens

The system responds to a power cycle and begins the system initiation. The three display screens show a blank, black screen instead of displaying the white Covidien screen.

Dark Screens

The system responds to a power cycle and begins the system initiation. The three display screens show a much darker screen of the expected white Covidien screen. This can range from slightly darker to nearly unreadable.

Flickering Screens

The system responds to a power cycle and begins the system initiation. The screen and/or screens begin to flicker. The flickering can happen once or occur constantly.

No Power

The system does not respond to a power cycle. The system displays and scanners do not illuminate.

User Self-Test Error

The system initiates the self-test and may pass a portion of the testing. The unit then fails at some point during the self-test. The unit will generate an error but not an error code.

Error Code Failures



Non-Error Code Failures - Gray Screens

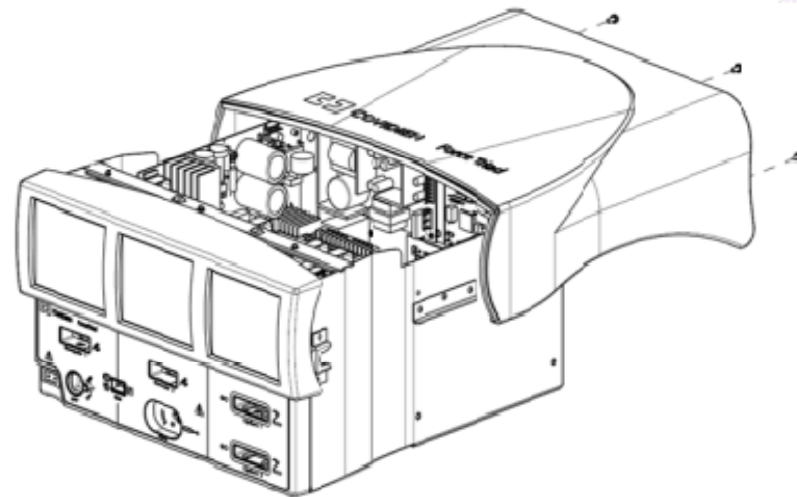
The failures that are generated where the displays are blank and gray, there are a couple of scenarios that could cause this. Typically, cables that are not connected or fully connected are the cause.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables

LEADING COMPONENT REPLACEMENTS

1. Ethernet Cable
 - (Cable between Controller and Display)
2. Steering Relay Cable
 - (Cable between SR and Display)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.

Non-Error Code Failures - Black Screens

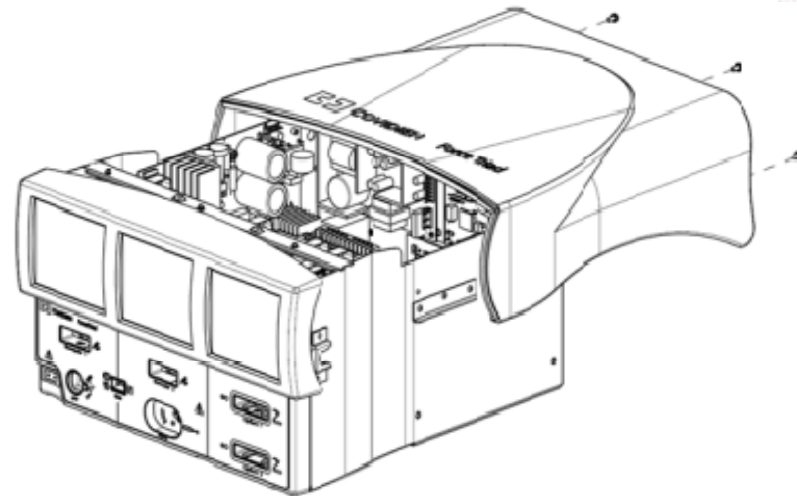
The failures that are generated where the displays are blank and black, there is typically one cause of this type of failure, the inverter board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables

LEADING COMPONENT REPLACEMENTS

1. [Inverter Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.

Non-Error Code Failures – No Power

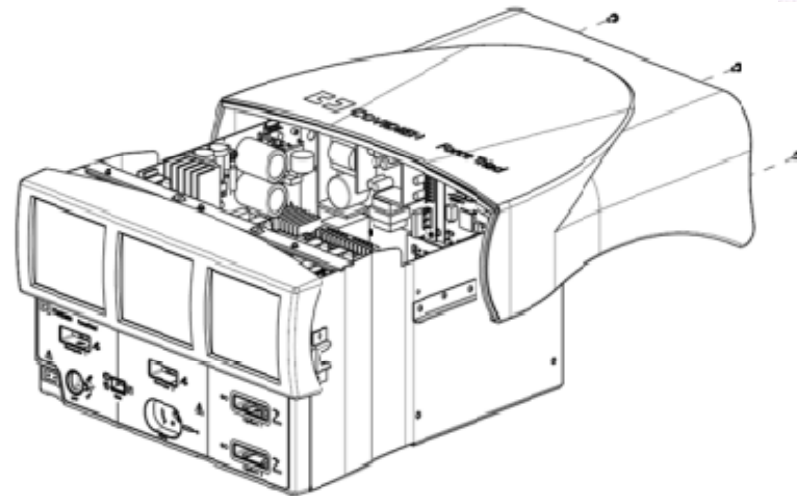
The failures that are generated where the system does not power on nor is there any indication that the system received a signal to power on. There are a couple of possibilities to cause this type of failure.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables

LEADING COMPONENT REPLACEMENTS

1. [System Fuse](#)
2. [Power Cable](#)
3. [Controller Board](#)
4. [Low Voltage Power Supply](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.

Non-Error Code Failures – User Self-Test

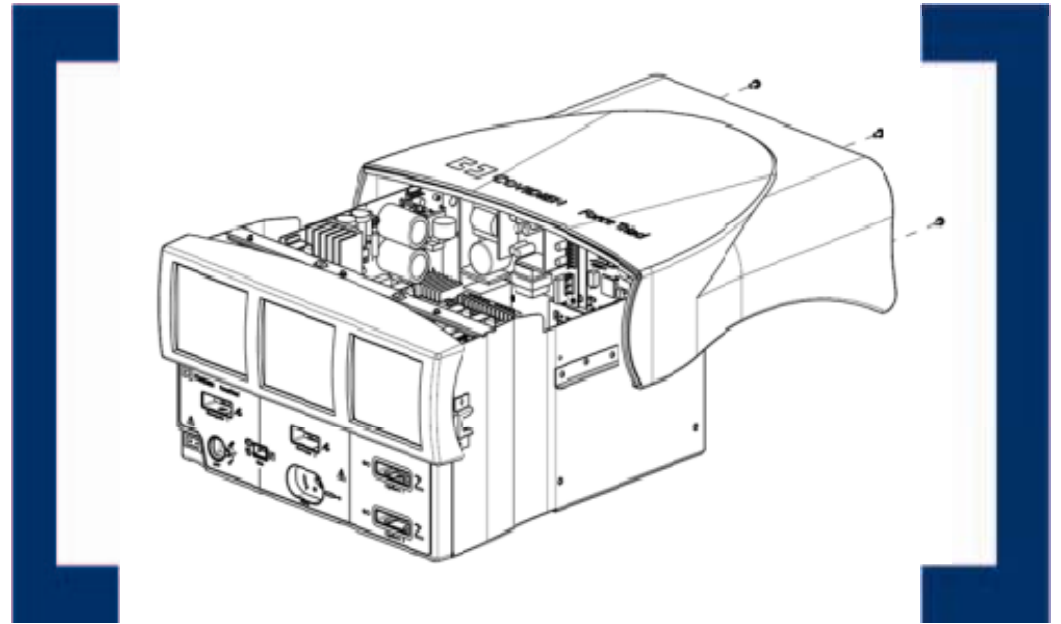
The failure that is generated where the system fails a user generated self-test via the "Diagnostics" menu the typical failure mode is the Footswitch Board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables

LEADING COMPONENT REPLACEMENTS

1. [Footswitch Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.

Non-Error Code Failures – Flickering Screens

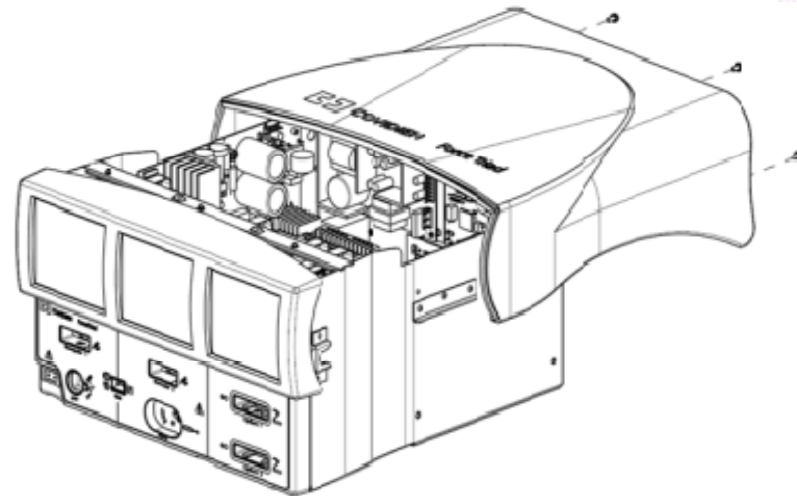
The failure that is generated where the system fails a user generated self-test via the "Diagnostics" menu the typical failure mode is the Footswitch Board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables

LEADING COMPONENT REPLACEMENTS

1. Power Cable
 - (Cable between SR and Display)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.

Non-Error Code Failures – Dark Screens

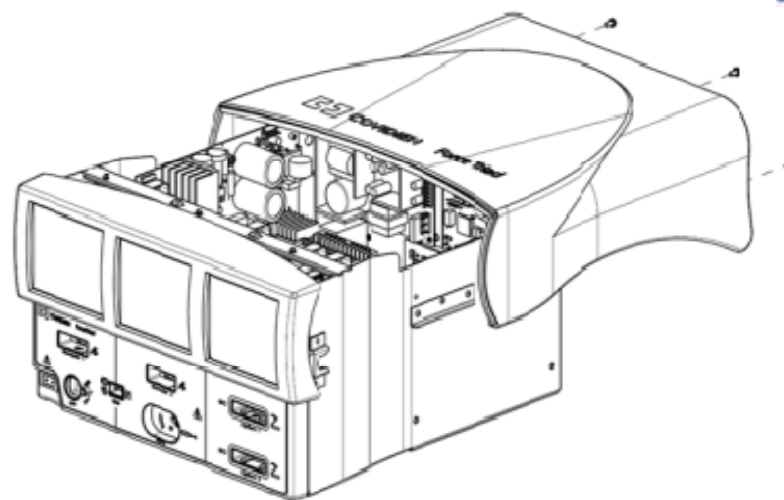
The failure that is generated where the system fails a user generated self-test via the "Diagnostics" menu the typical failure mode is the Footswitch Board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Inspecting the component cables
3. Brightness calibration

LEADING COMPONENT REPLACEMENTS

1. [Display Inverter](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a brightness calibration as outlined in the Service Manual.

E2 – ERR_SE_ICL_ERROR

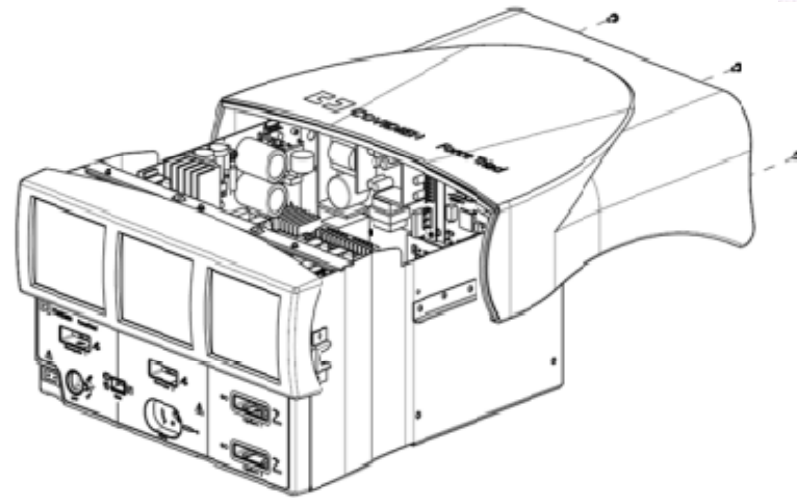
The E2 error code is designated and issued to signify that the unit is unable to communicate to the hardware using the HOST ICL registers.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E3 – ERR_SE_APP_ROM_FAIL

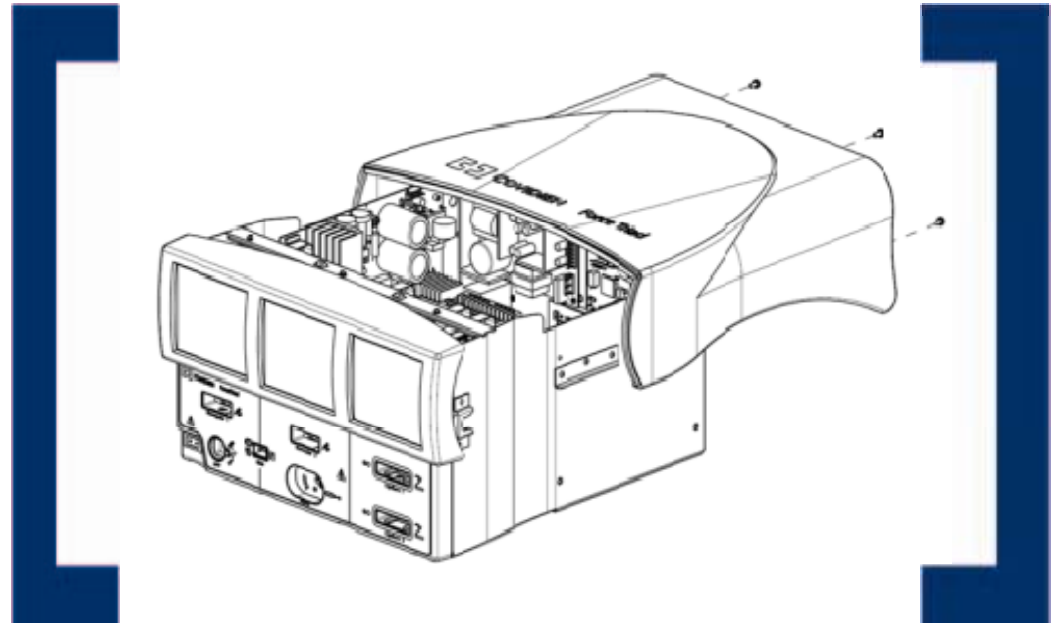
The E3 error code is designated and issued to signify that the DSP application ROM check failed during start-up.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E4 – ERR_SE_BOOT_ROM_FAIL

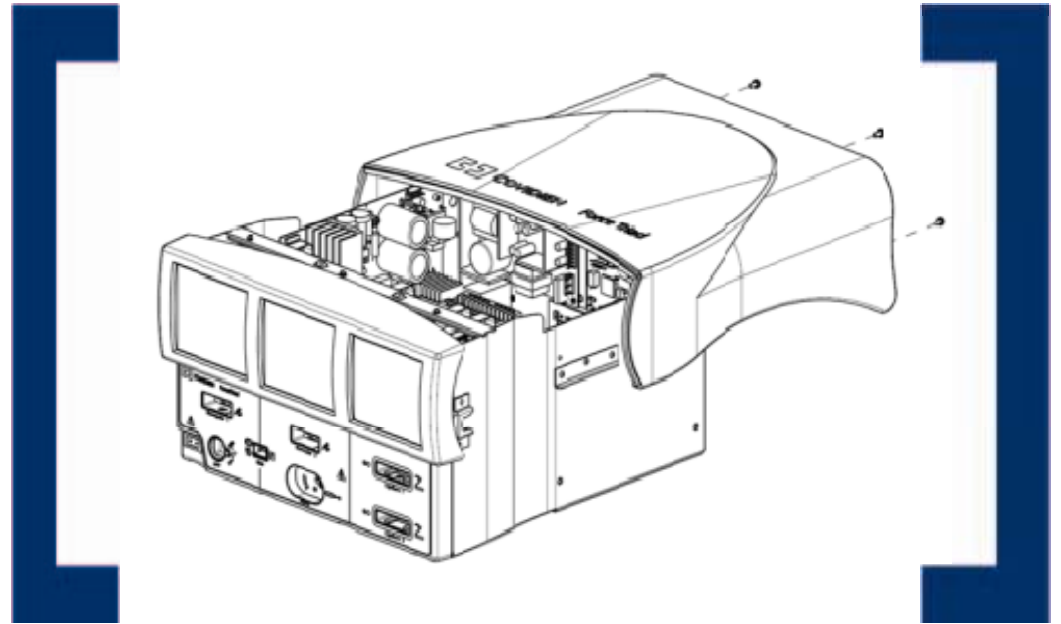
The E4 error code is designated and issued to signify that the DSP boot ROM check failed during start-up.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E5 - ERR_SE_RAM_FAIL

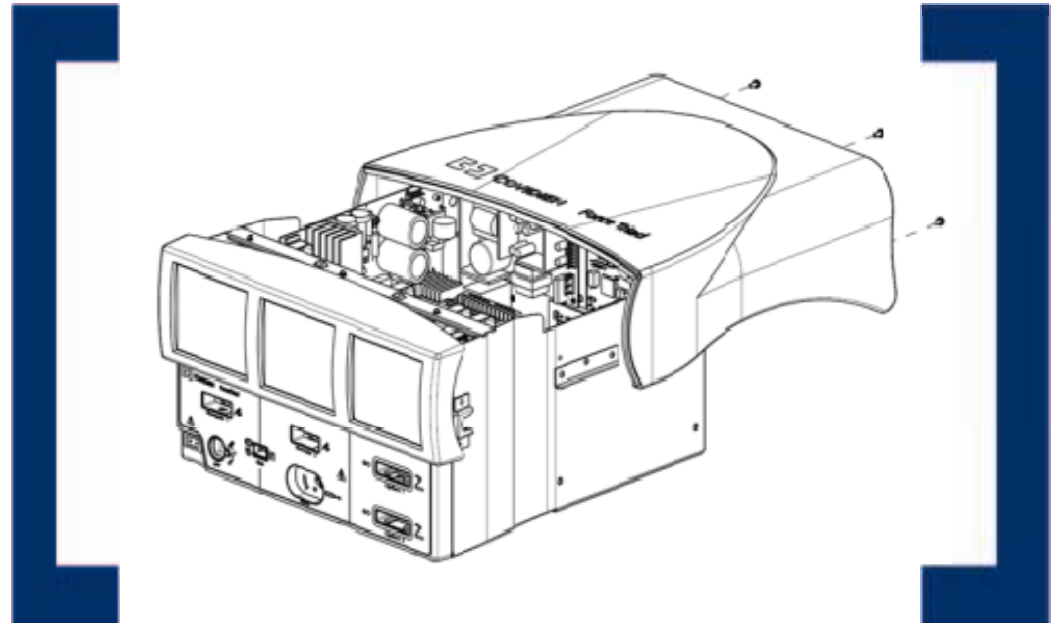
The E5 error code is designated and issued to signify that the DSP RAM check failed during start-up.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E6 – ERR_SE_RTOS_FAIL

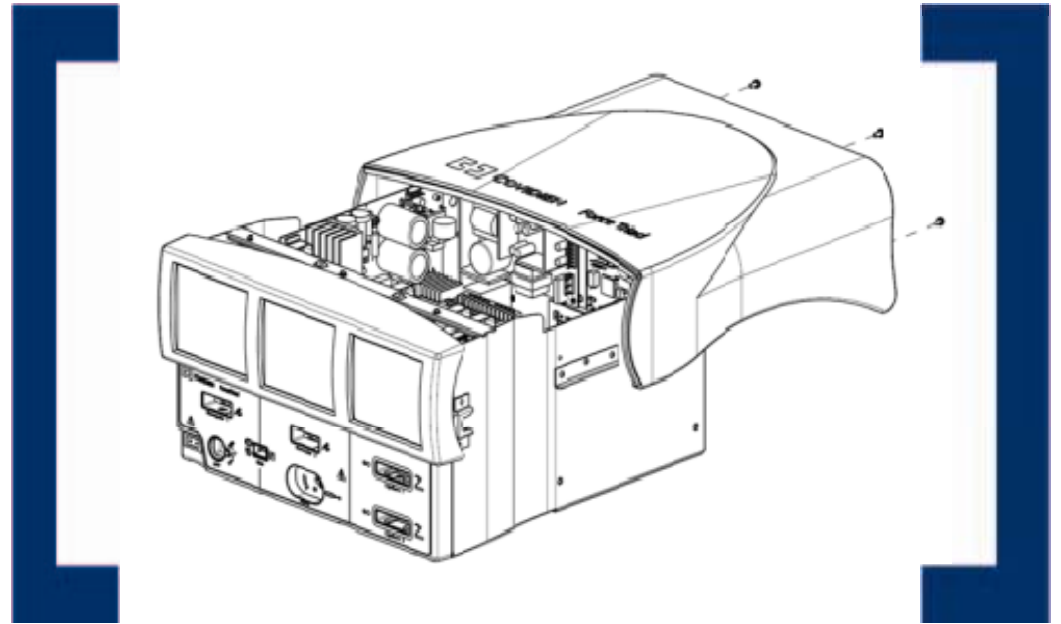
The E6 error code is designated and issued to signify that a software error has occurred. The E6 error code is typically issued during real time to signify an operating system error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [System Display](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E7 – ERR_SE_GEN_FAIL

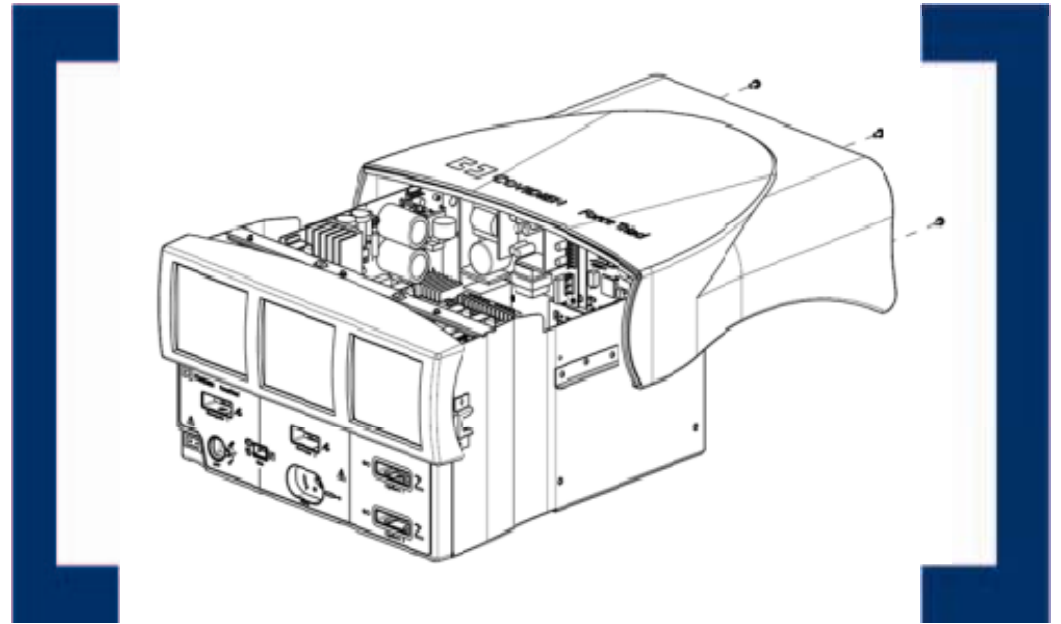
The E7 error code is designated and issued to signify that the generator has developed a general system error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E8 - ERR_SE_CRITICAL_DATA

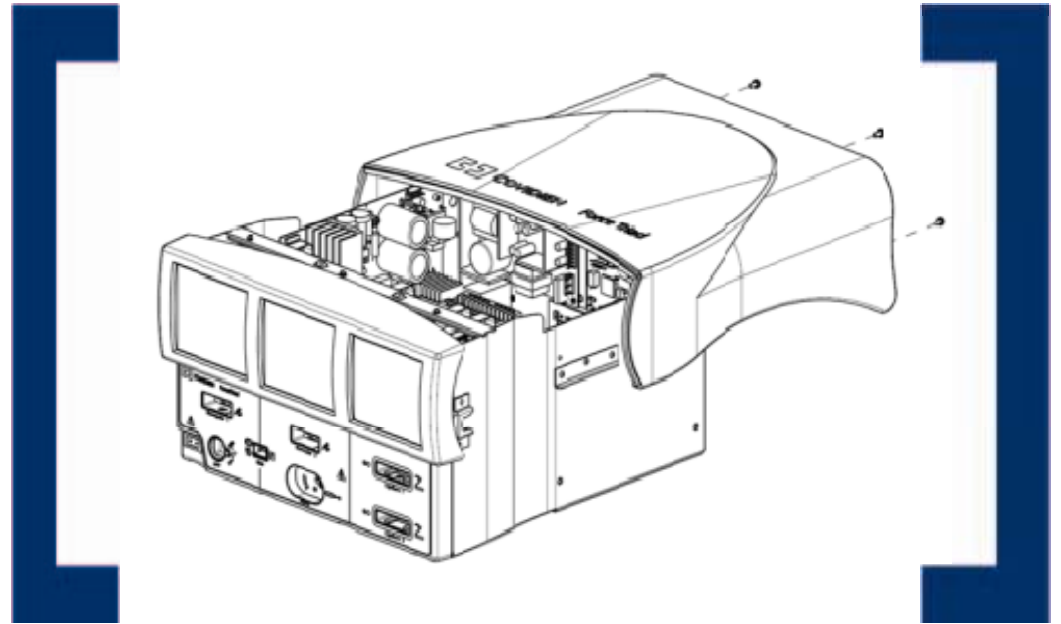
The E8 error code is designated and issued to signify that the system has a software error caused by a corrupt data string.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E9 - ERR_SE_ASSERT

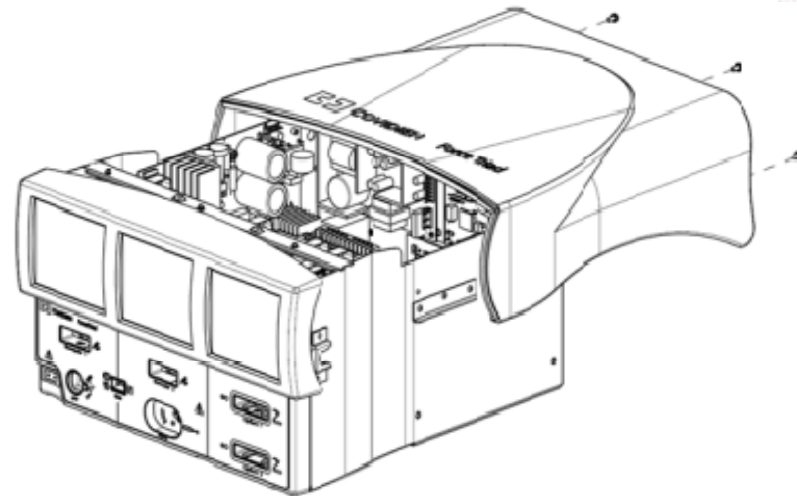
The E9 error code is designated and issued to signify that the system has developed a software error that has generated an assertion.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E10 - ERR_SE_INVALID_DATA

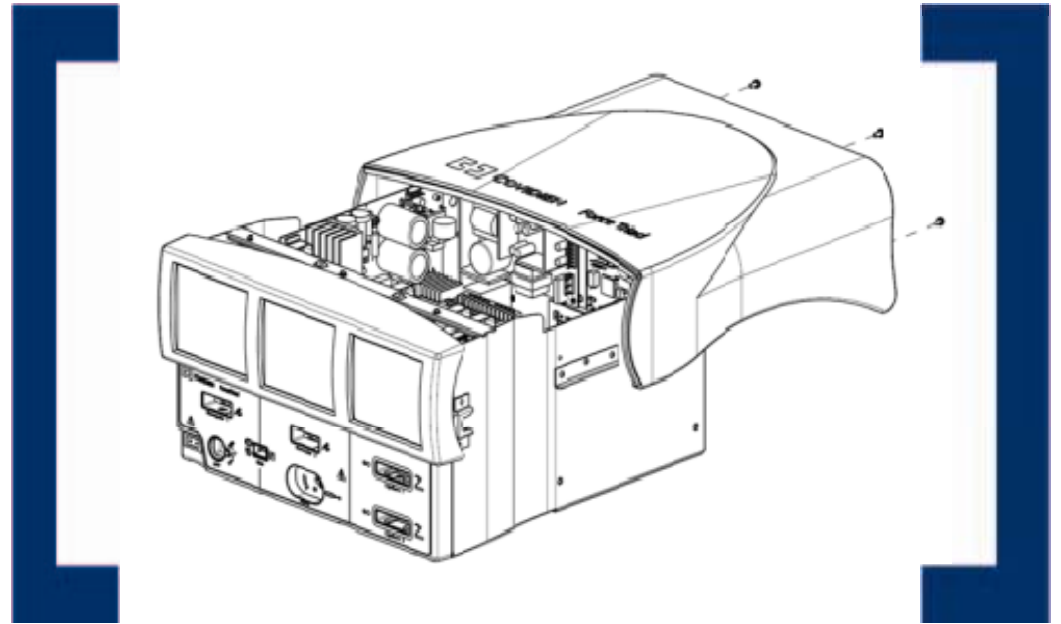
The E10 error code is designated and issued to signify that a software failure occurred because of an invalid data string.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E11 - ERR_SE_MACHINE_CHECK_EXCEPTION

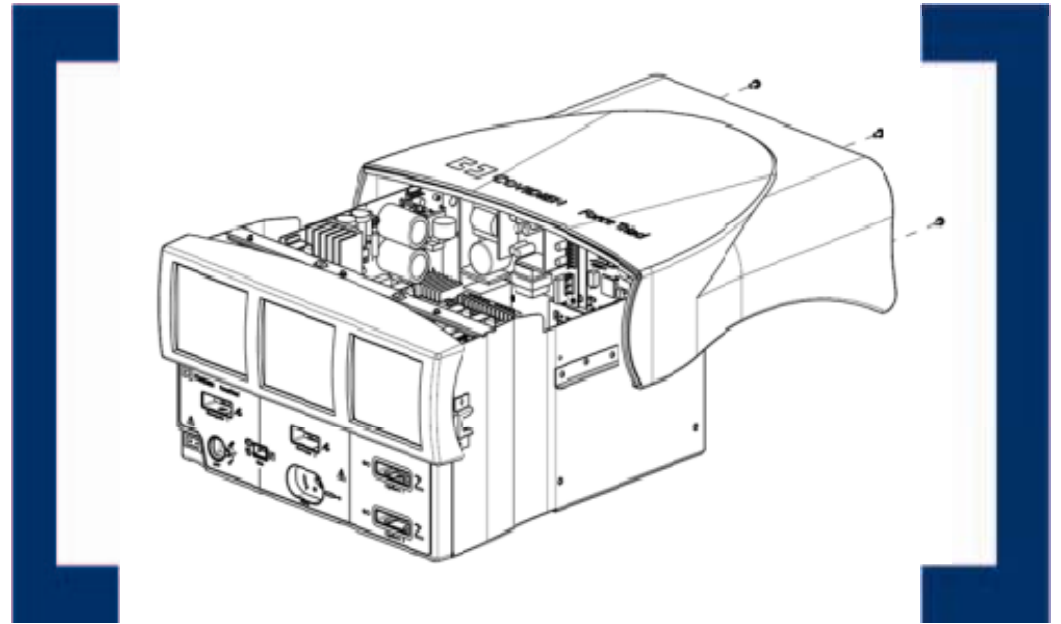
The E11 error code is designated and issued to signify that a HOST processor machine check exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E12 - ERR_SE_DATA_STORAGE_EXCEPTION

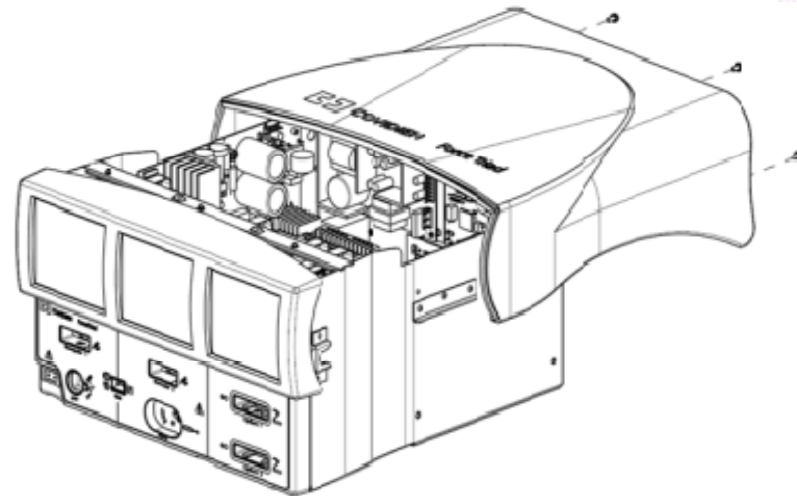
The E12 error code is designated and issued to signify that a HOST processor data storage exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E13 - ERR_SE_ISI_EXCEPTION

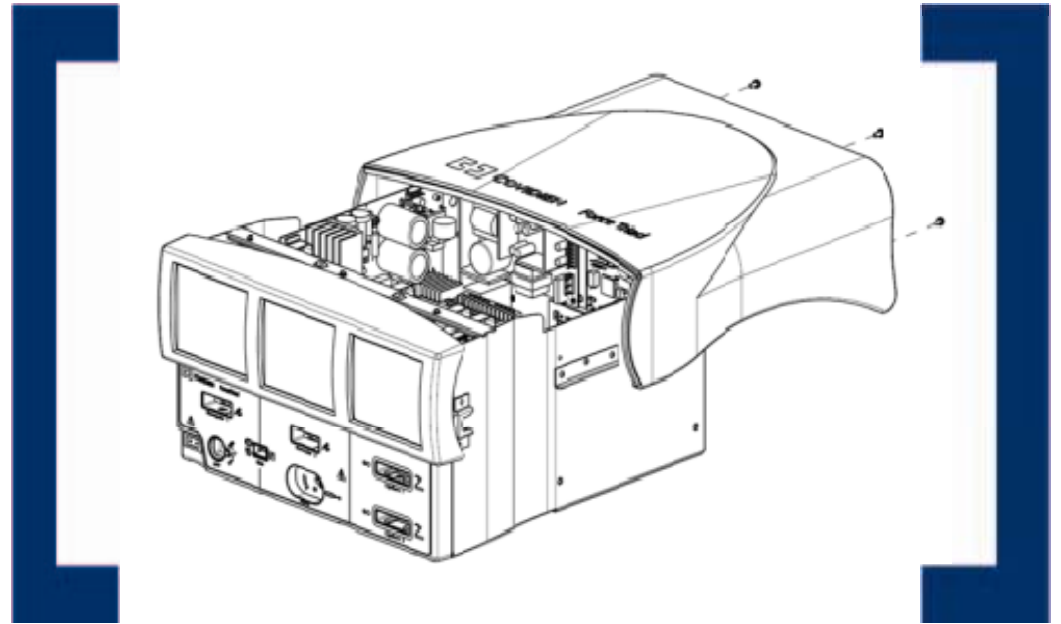
The E13 error code is designated and issued to signify that a HOST processor data storage exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E14 - ERR_SE_ALIGNMENT_EXCEPTION

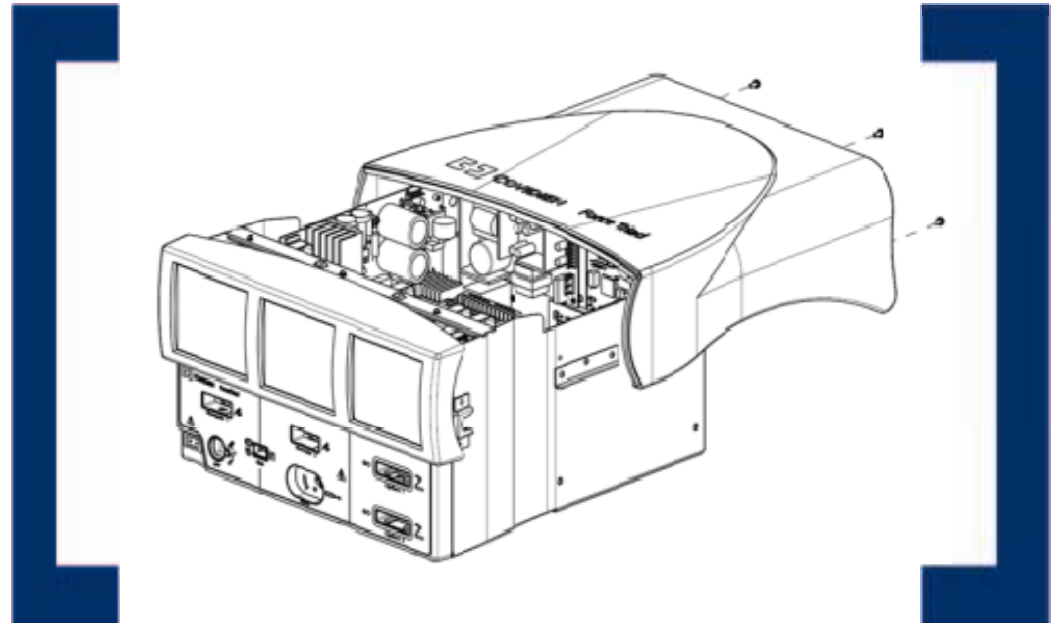
The E14 error code is designated and issued to signify that a HOST processor alignment exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E15 - ERR_SE_PROGRAM_EXCEPTION

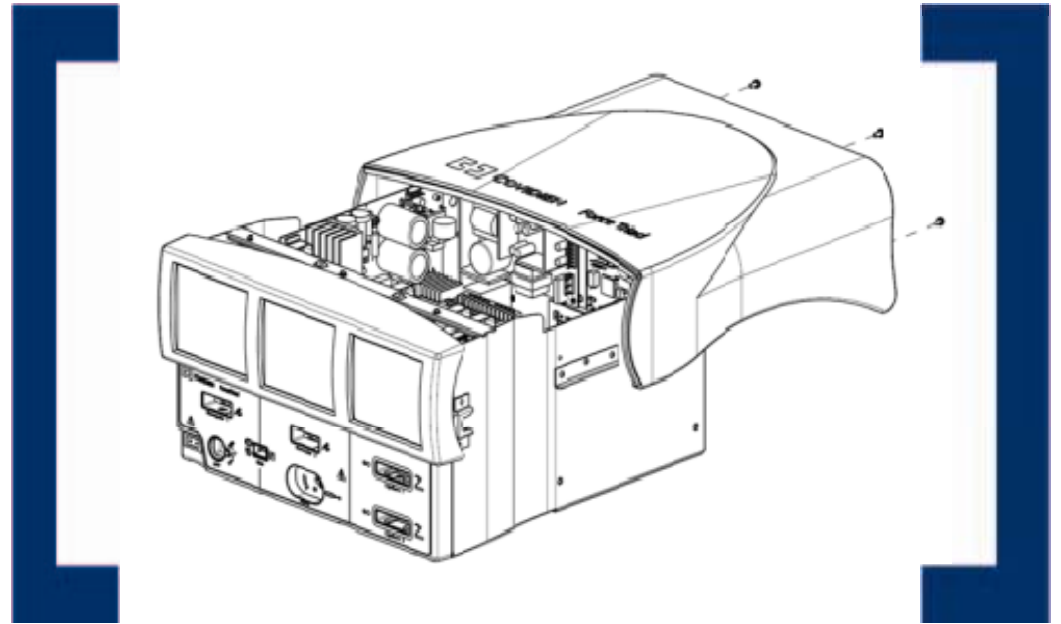
The E15 error code is designated and issued to signify that a HOST processor program exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E16 - ERR_SE_FP_UNAVAILABLE_EXCEPTION

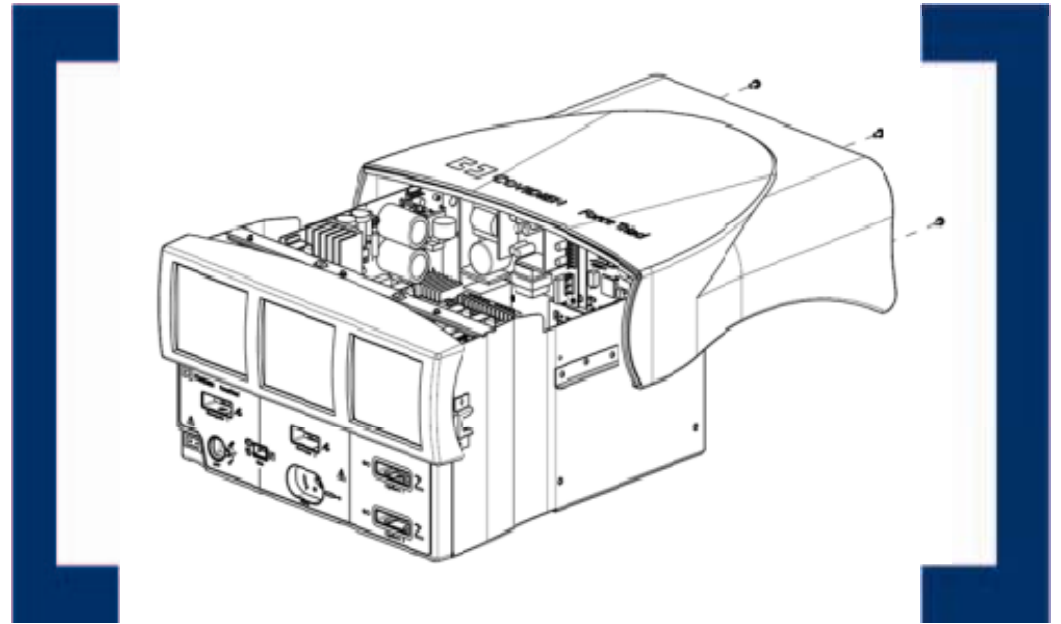
The E16 error code is designated and issued to signify that a HOST processor floating point unavailable exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E17 - ERR_SE_SYS_CAL_EXCEPTION

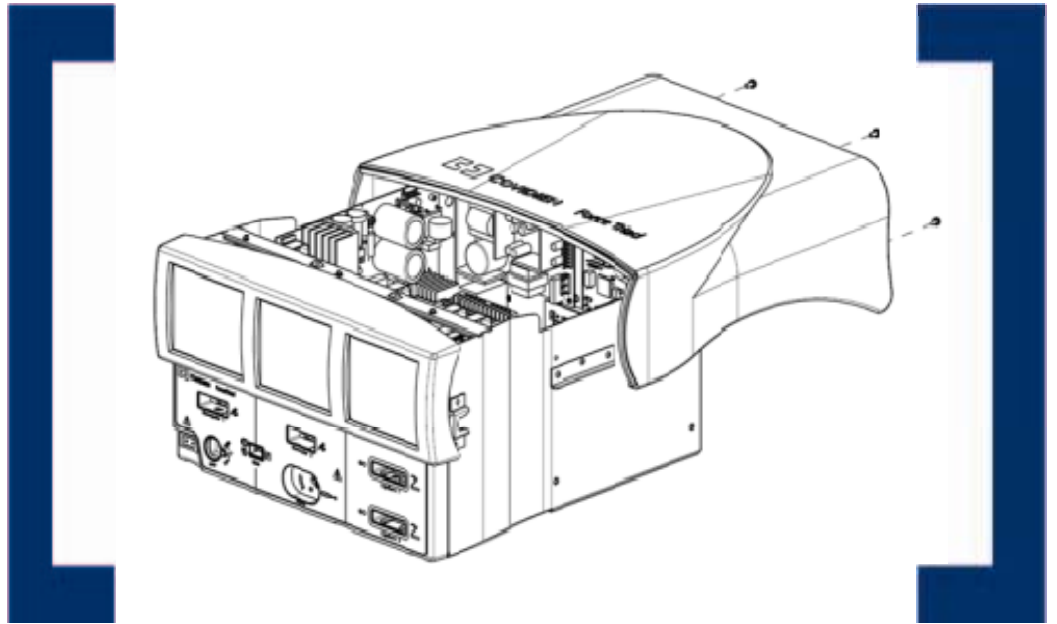
The E17 error code is designated and issued to signify that a HOST processor system call exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E18 - ERR_SE_TRACE_EXCEPTION

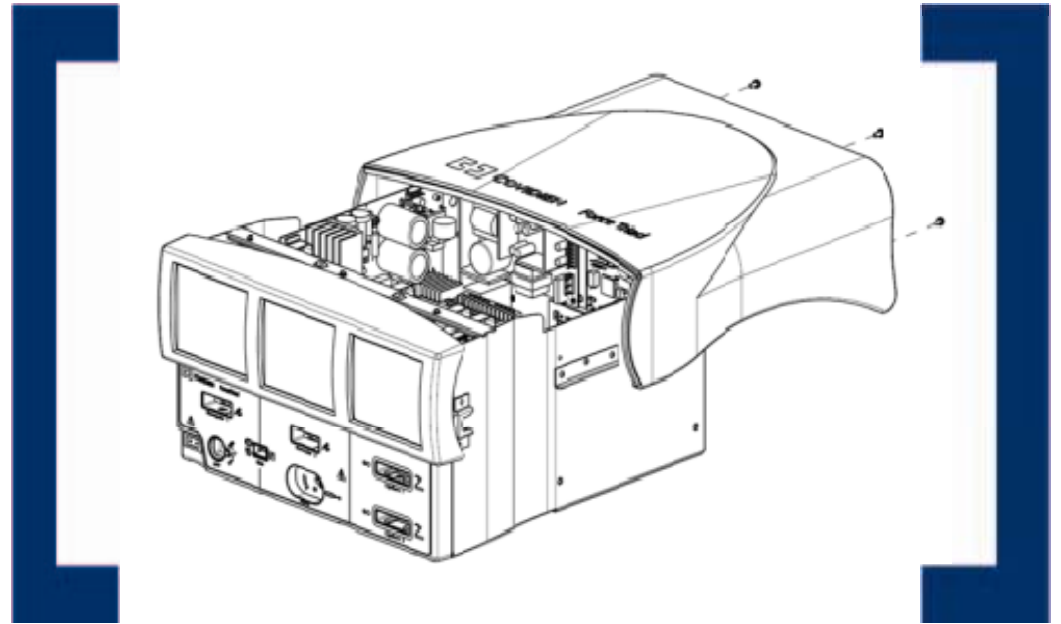
The E18 error code is designated and issued to signify that a HOST processor trace exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E19 - ERR_FP_ASSIST_EXCEPTION

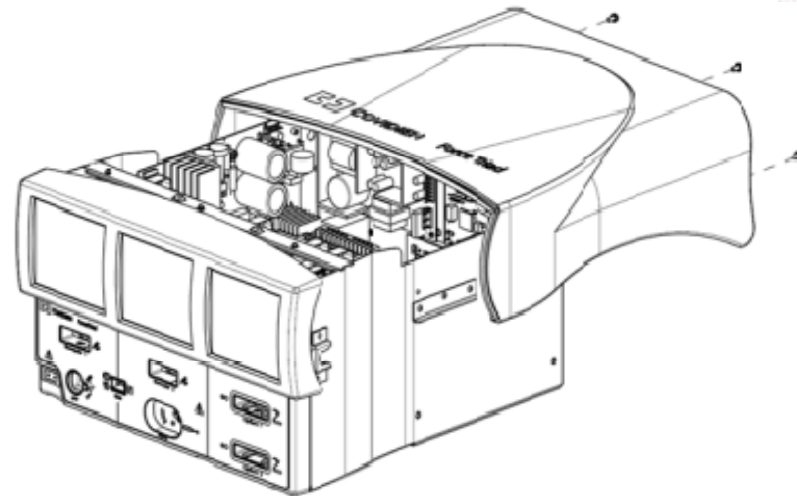
The E19 error code is designated and issued to signify that a HOST processor floating point assist exception has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.



E20 - ERR_SE_MEM_ALLOC_FAIL

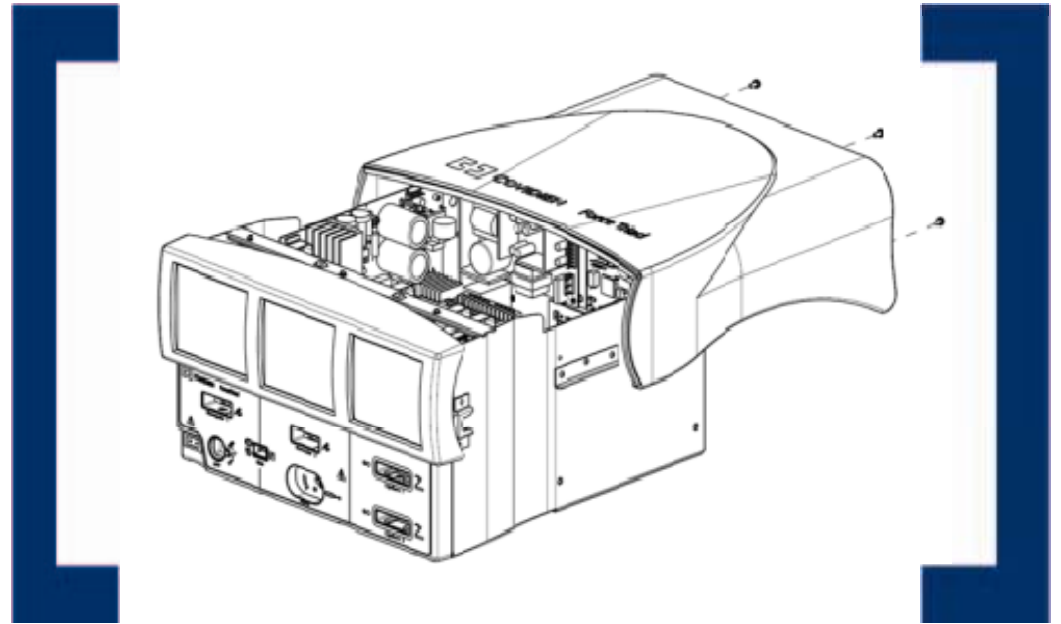
The E20 error code is designated and issued to signify that a memory allocation failure within the unit has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E21 - ERR_SE_UNKNOWN_EXCEPTION

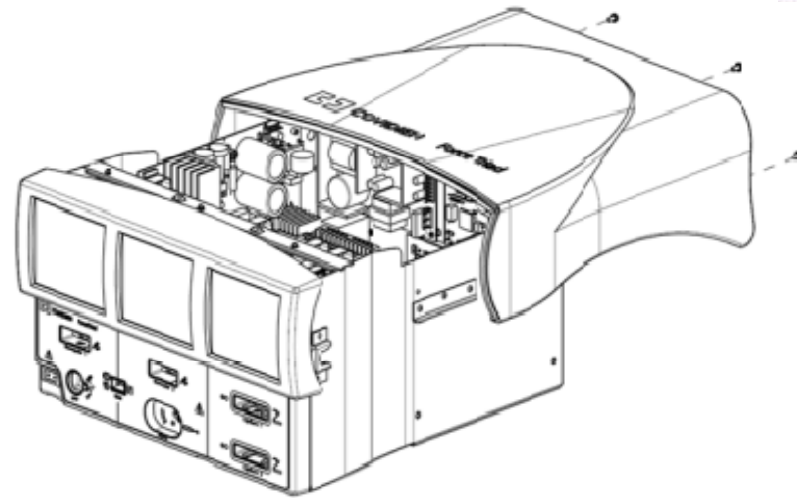
The E21 error code is designated and issued to signify that a HOST processor has generated an unknown exception and that the exception vector is not a valid vector.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E22 - ERR_SE_UNKNOWN_INTERRUPT

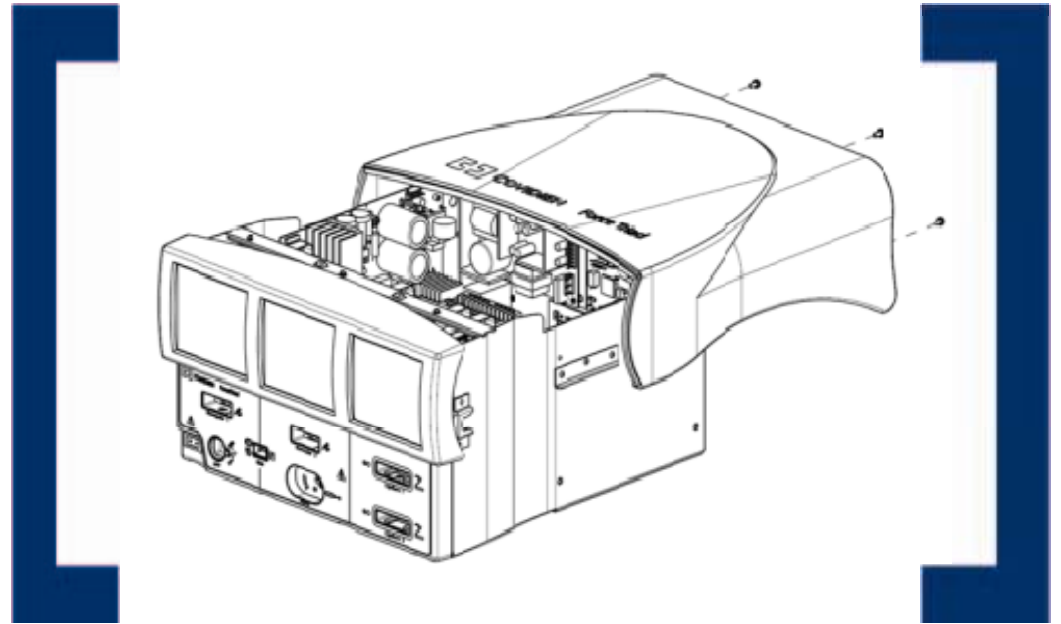
The E22 error code is designated and issued to signify that a HOST processor has received an interrupt that is not initialized.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E23 - ERR_SE_STACK_OVERFLOW

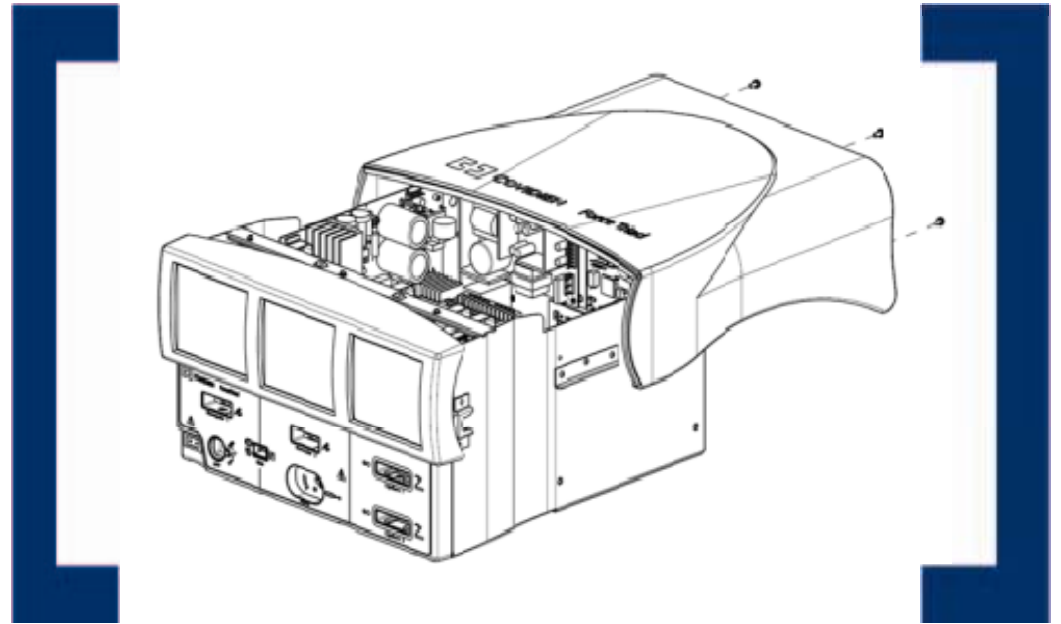
The E23 error code is designated and issued to signify that a thread on the HOST has overflowed its stack.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E24 - ERR_SE_DMA_FAILURE

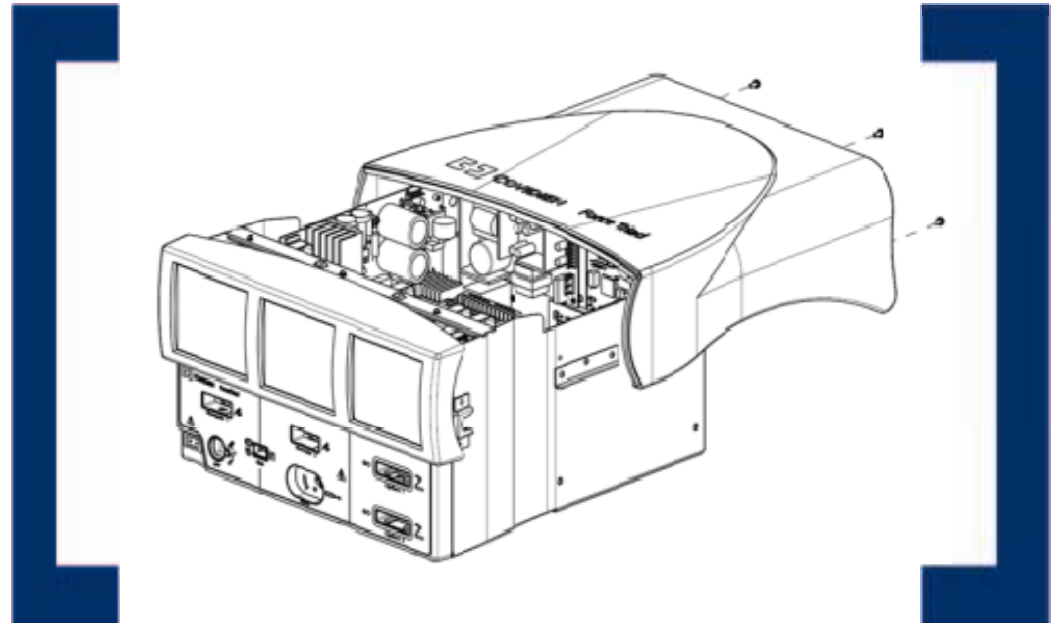
The E24 error code is designated and issued to signify that the iDMA is stuck.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E25 - ERR_SE_UNHANDLED_INTERRUPT

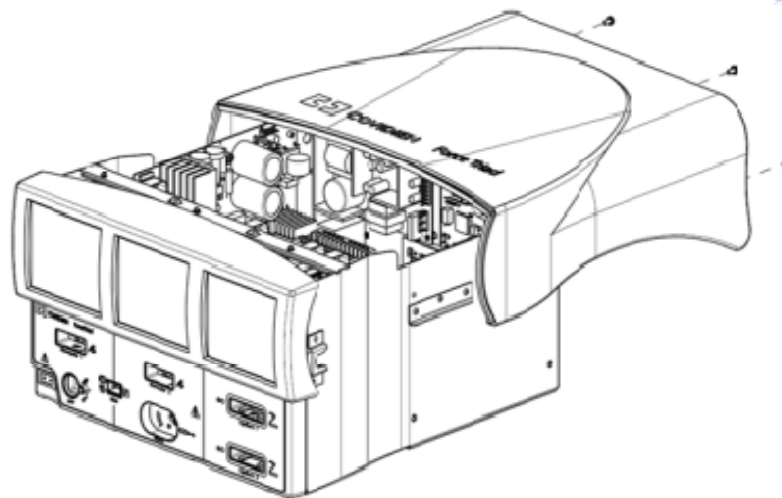
The E25 error code is designated and issued to signify that a HOST processor has received an interrupt that it does not how to handle..

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E26 - ERR_SE_MAX_NUM_THREADS_REG

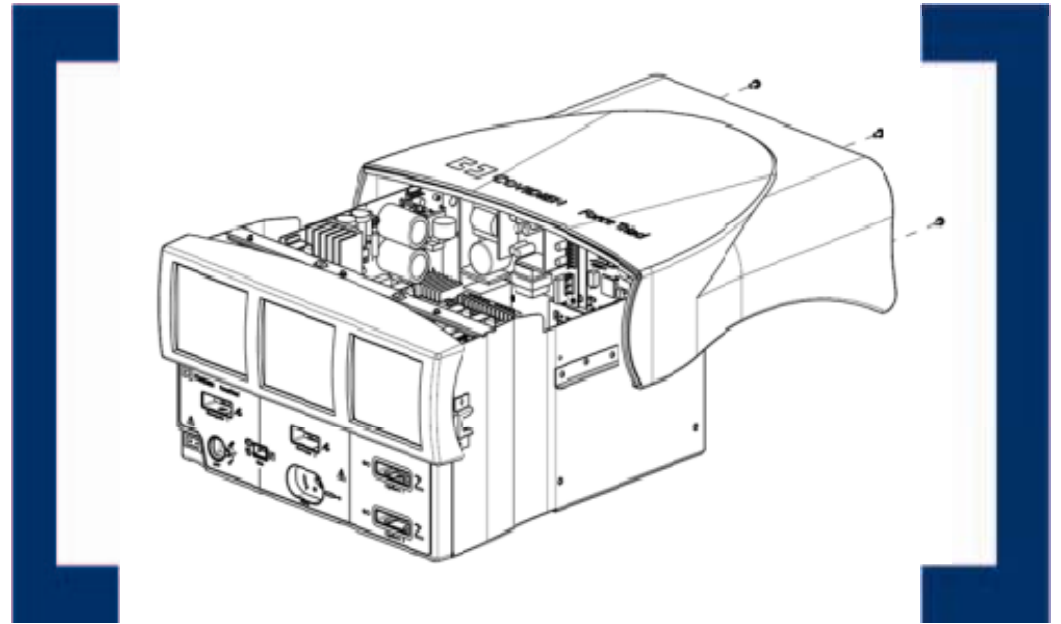
The E289 error code is designated and issued to signify that a HOST code has attempted to register more threads than what is allowed.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E27 - ERR_SE_NULL_POINTER

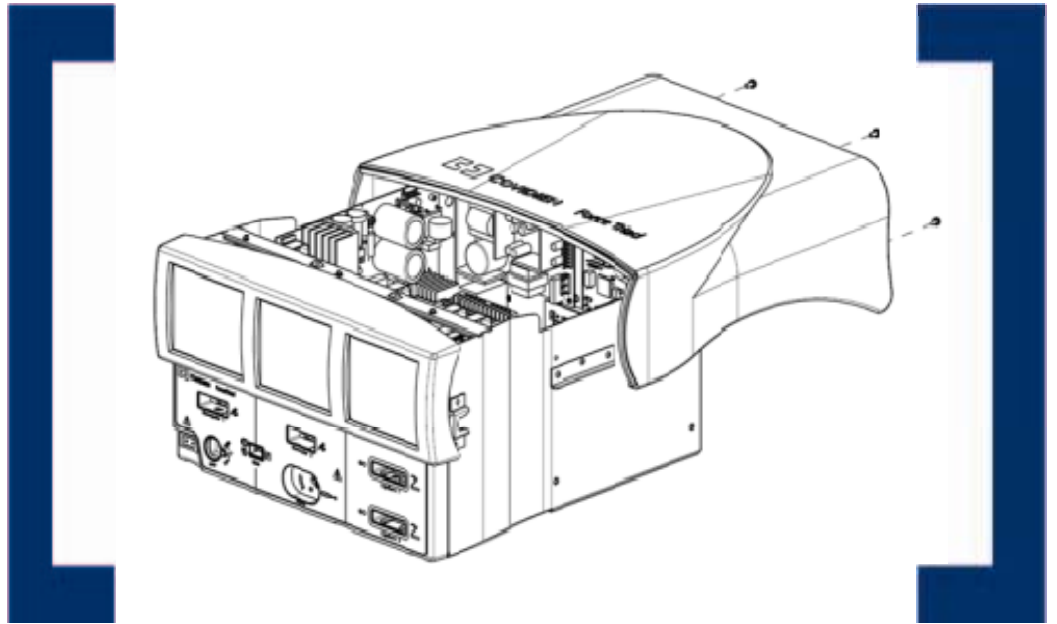
The E27 error code is designated and issued to signify that a HOST code has detected a pointer that has a NULL value.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E257 - ERR_NR_DOSAGE

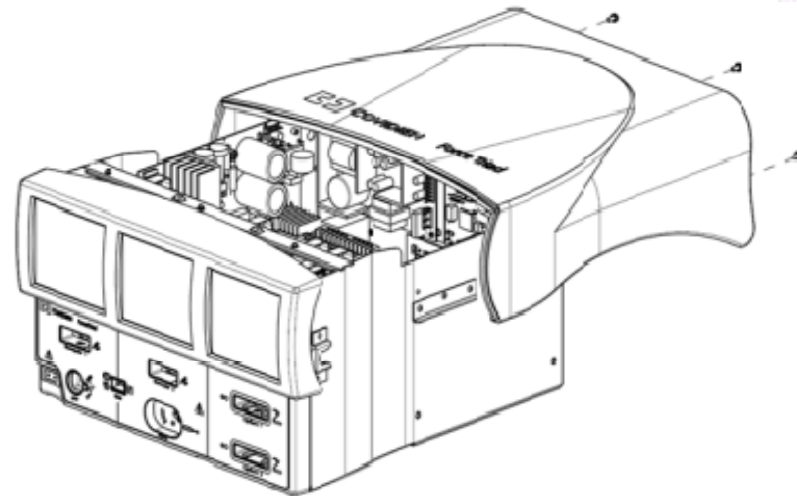
The E257 error code is designated and issued to signify that the system has a general RF dosage error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [RF Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E258 - ERR_NR_MEM_ALLOC_FAIL

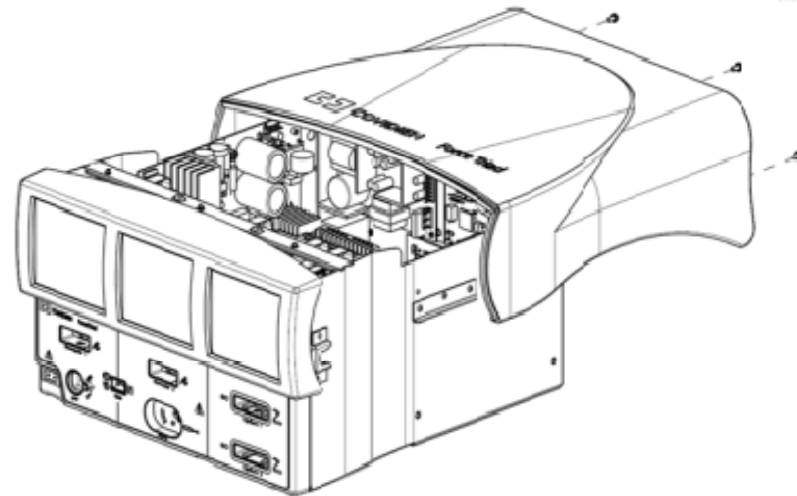
The E258 error code is designated and issued to signify that the system has generated a memory allocation software error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E259 - ERR_NR_INVALID_DATA

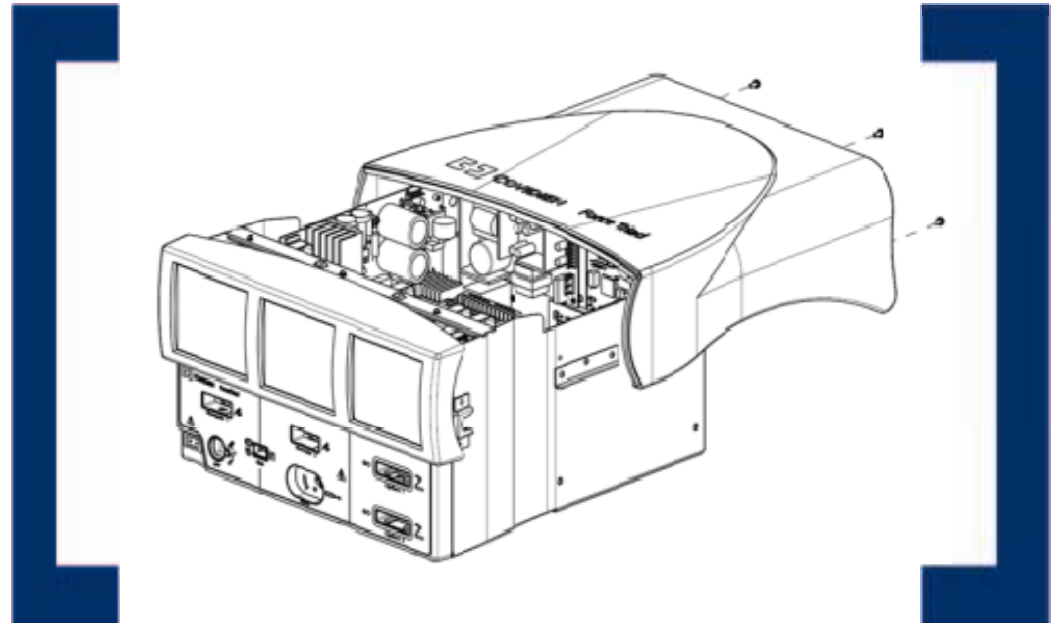
The E259 error code is designated and issued to signify that the system has generated invalid data causing a software error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E260 - ERR_NR_COM_ERROR

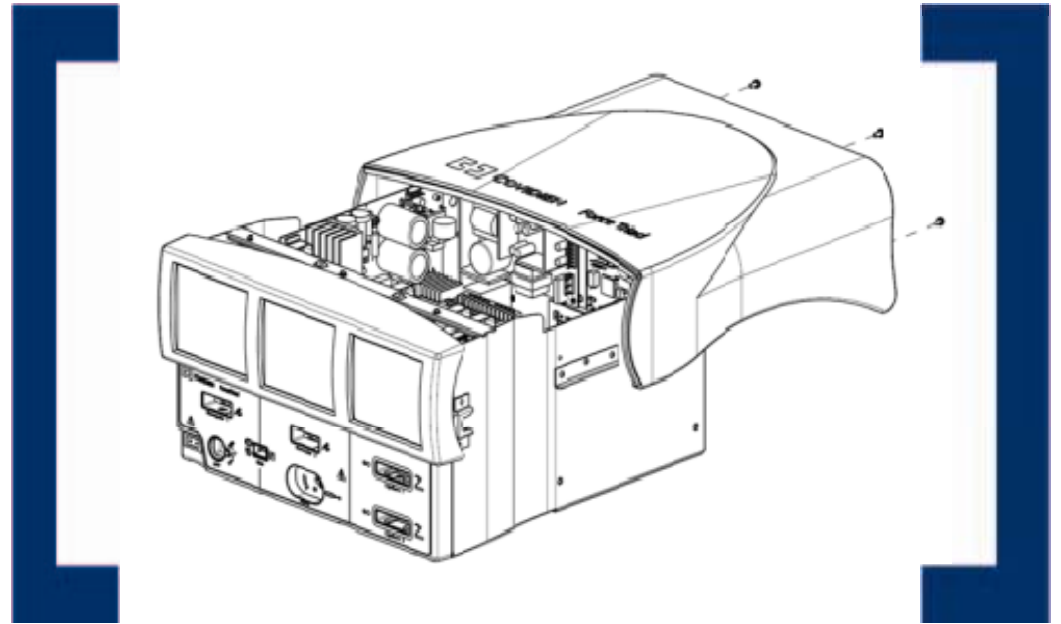
The E260 error code is designated and issued to signify that the system has generated a generic communication error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Verify the ribbon cables and FTSW cable connections are securely seated.
4. Perform a level 6 calibration as outlined in the Calibration Section.

E261 - ERR_NR_HW_ERROR

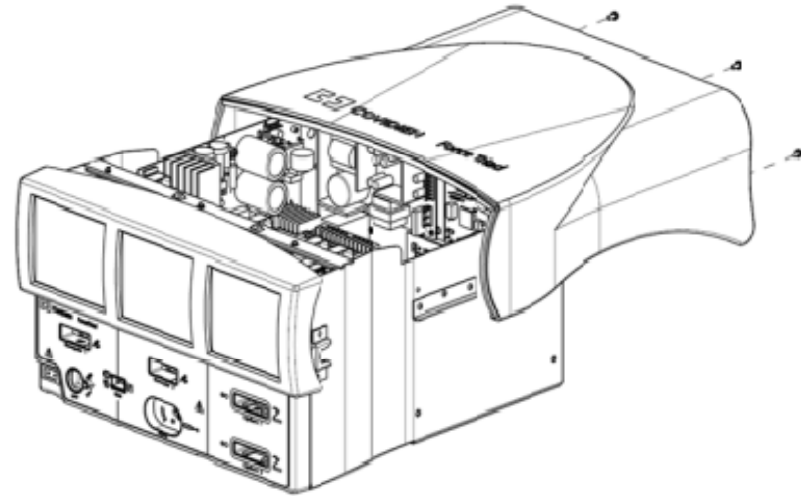
The E289 error code is designated and issued to signify that the system has generated a hardware or controller error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [HVDC Board](#)
2. [Low Voltage Power Supply](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E262 - ERR_NR_ACT_DENIED

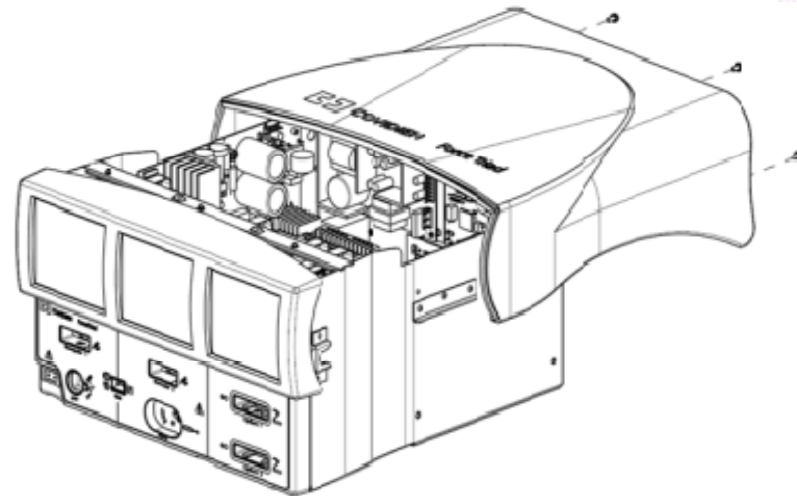
The E262 error code is designated and issued to signify that the system has denied activation and generated an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [FTSW Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E263 - ERR_NR_INVALID_STATE

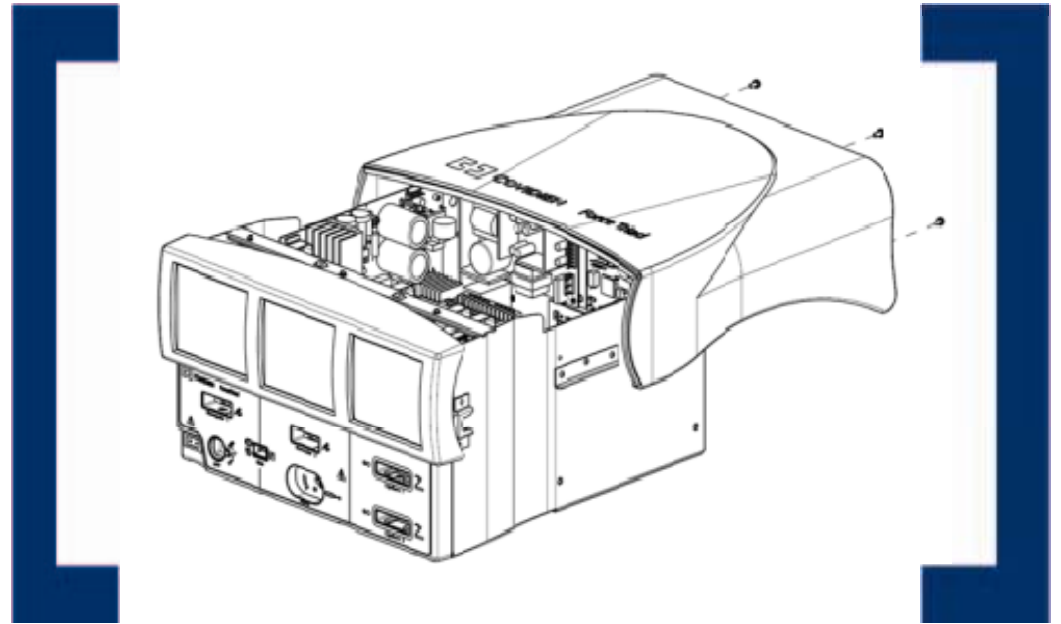
The E263 error code is designated and issued to signify that the system has entered an invalid state and generated an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E264 - ERR_NR_UNSUPPORTED_CMD

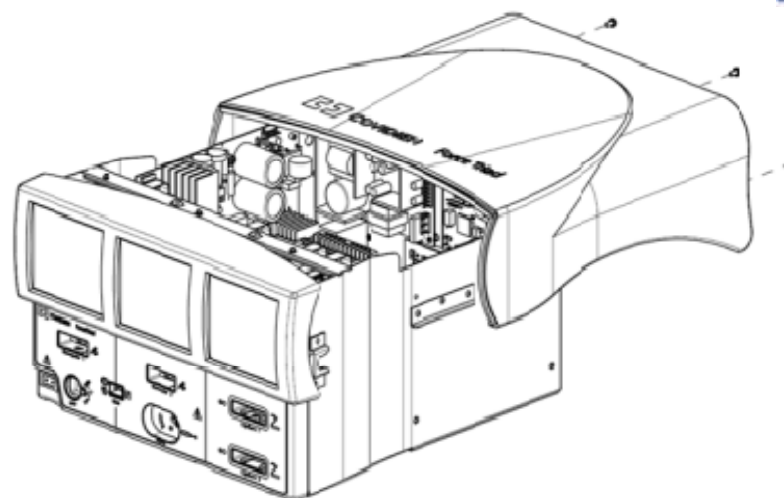
The E264 error code is designated and issued to signify that the system has interrupted a command that is not supported and generated an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E265 - ERR_NR_ACCESS_FUNCTION

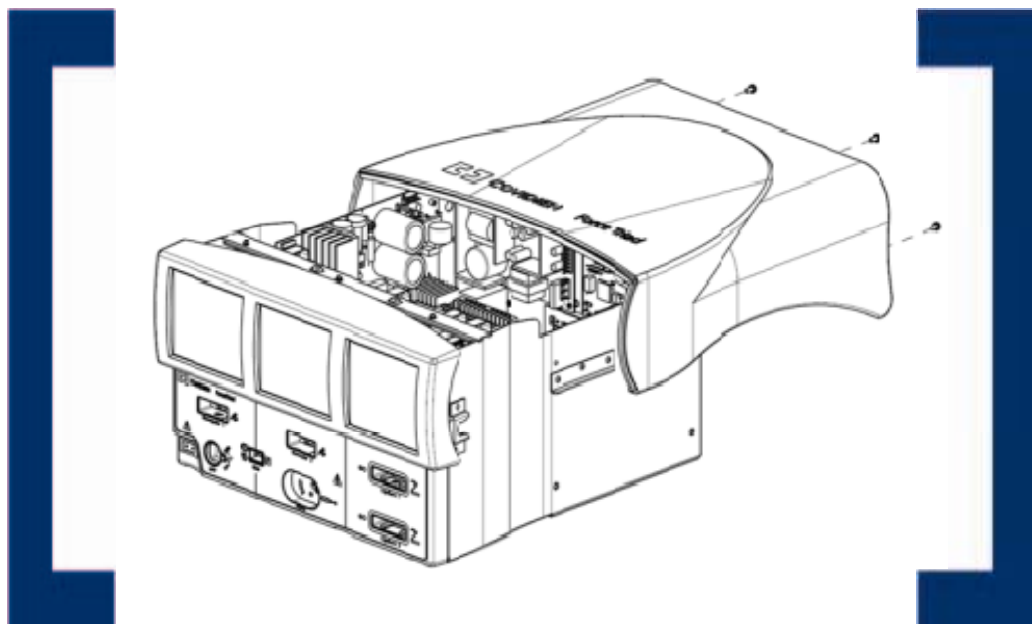
The E265 error code is designated and issued to signify that the system has generated an error while performing an access function.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E266 - ERR_NR_TIMEOUT_ERROR

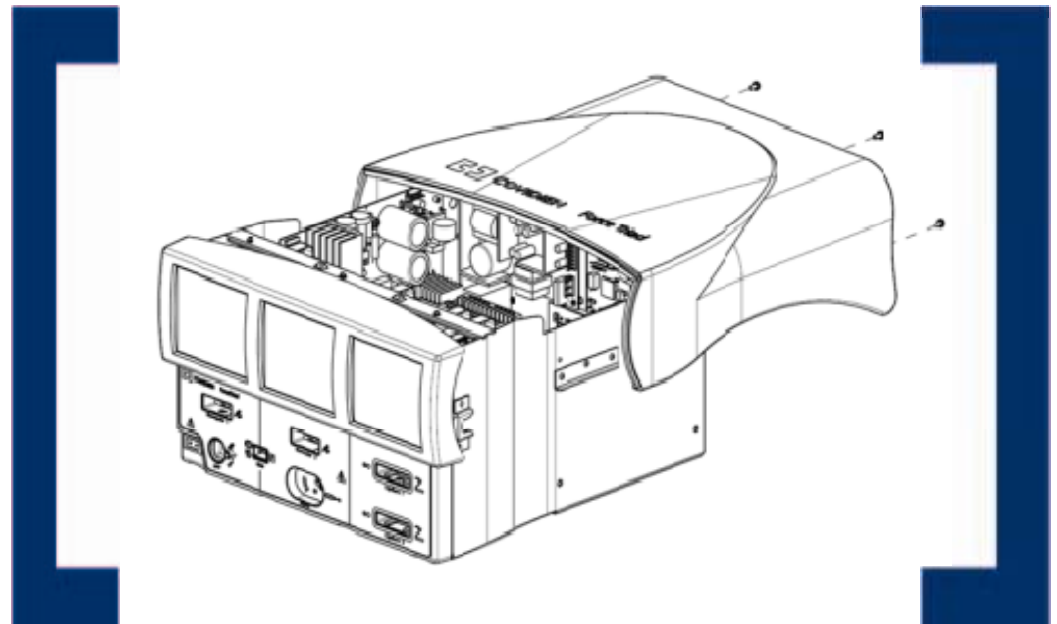
The E266 error code is designated and issued to signify that the system has generated a timeout and caused an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Verify the ribbon cables and FTSW cable connections are securely seated.
4. Perform a level 6 calibration as outlined in the Calibration Section.

E267 - ERR_NR_GEN_ERROR

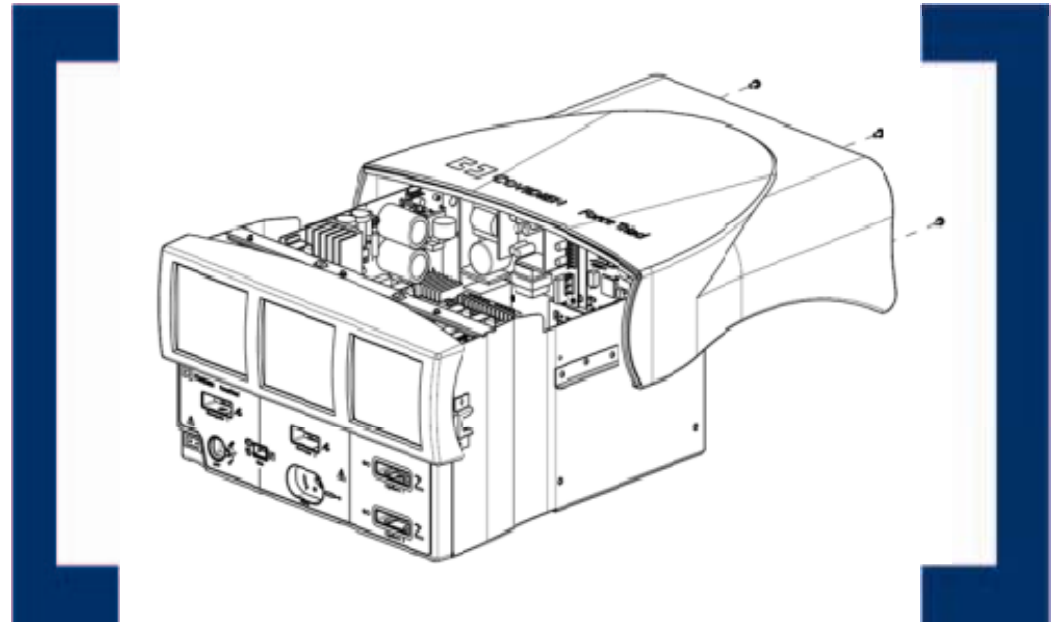
The E267 error code is designated and issued to signify that the system has generated an unknown system error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E268 - ERR_NR_SELF_TEST_ERROR

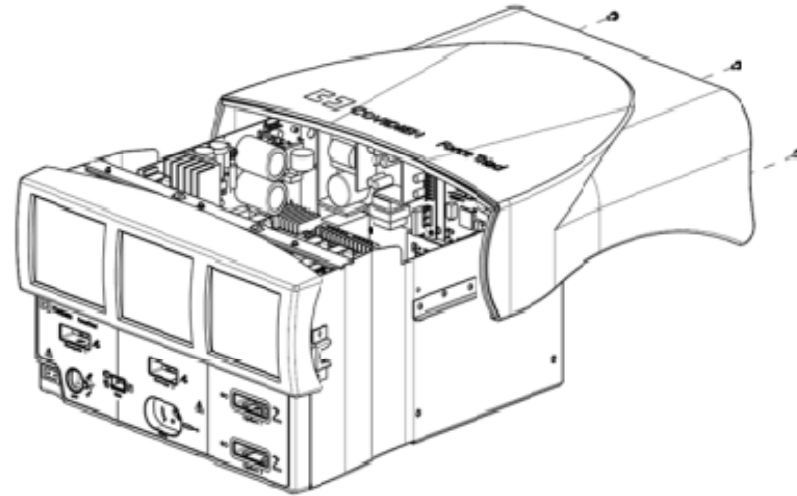
The E268 error code is designated and issued to signify that the system has failed the initial start-up self test and generated an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E269 - ERR_NR_DISPLAY_ERROR

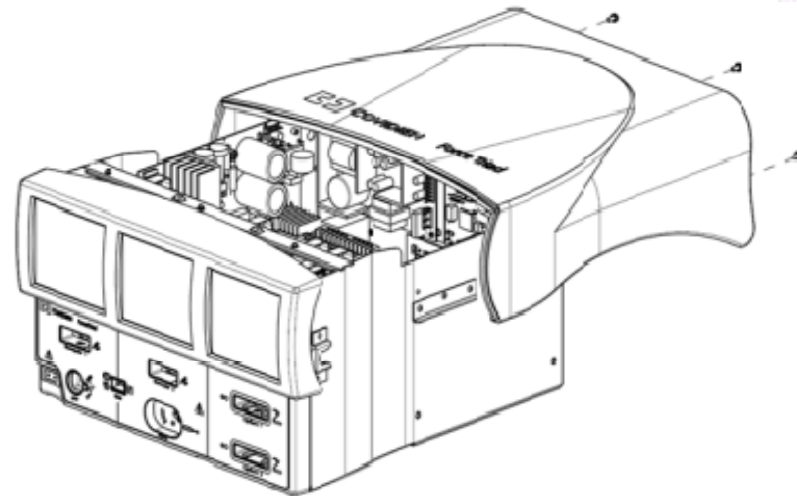
The E269 error code is designated and issued to signify that the system has generated an error due to a display issue during start-up.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Displays Cables](#)
2. [Displays](#)
3. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E270 - ERR_NR_AUDIBLE_ERROR

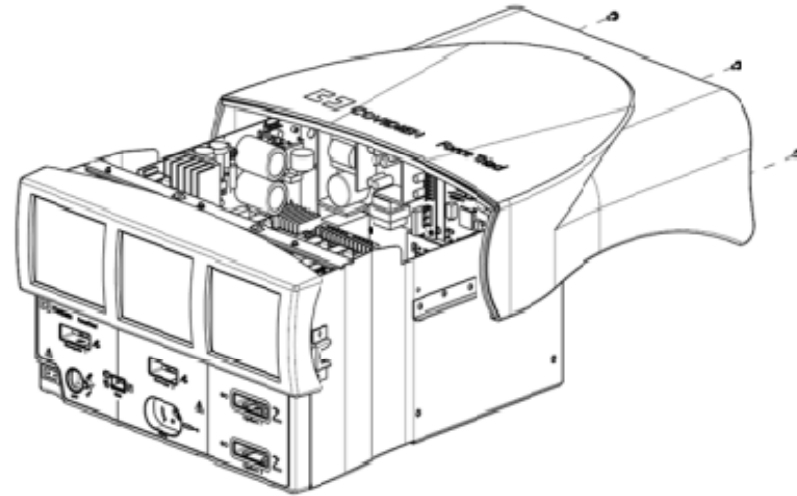
The E270 error code is designated and issued to signify that the system has failed the audible self test and generated an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Foot Switch Board](#)
2. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E271 - ERR_NR_STUCK_BUTTON_ERROR

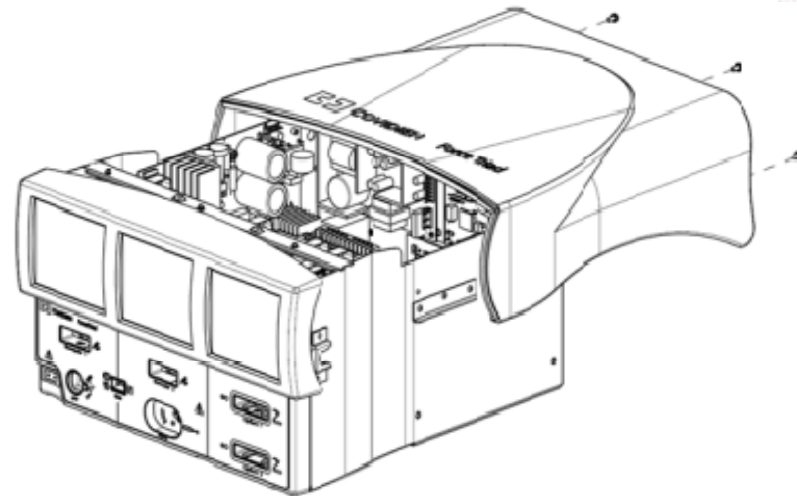
The E271 error code is designated and issued to signify that the system has generated an error during the self-test due to a stuck button.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [Displays](#)
3. [FTSW Board](#)



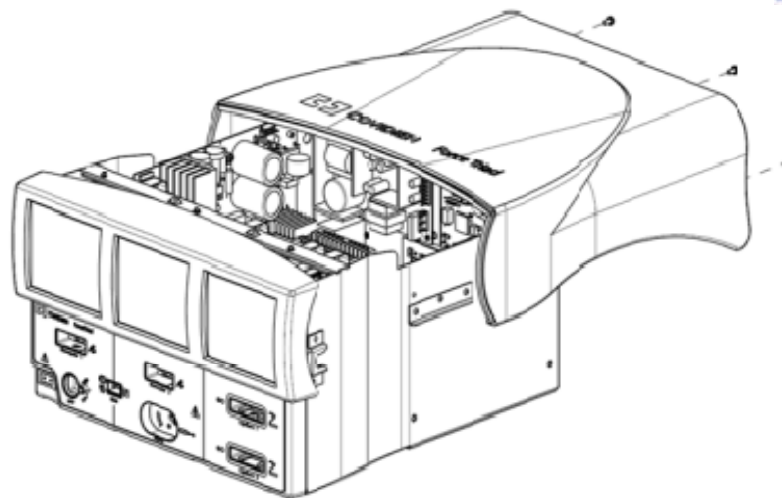
NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E272 – NOT_USED

The E272 error code is not used.

Should you have a version of ForceTriad that delivers a E272 error code, please contact your local Covidien Customer Service representative for further information.



E273 - ERR_NR_INTER_PROC_COM_ERROR

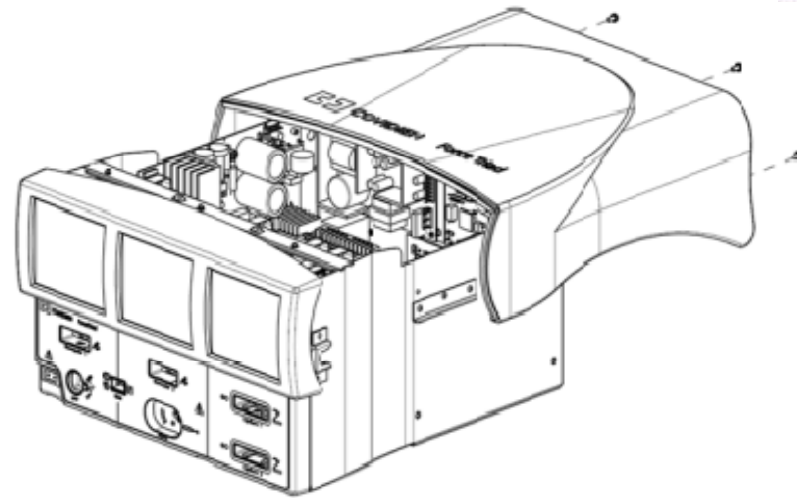
The E273 error code is designated and issued to signify that the system has generated an error during self-test due to an inter-processor communication issue.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E274 - ERR_NR_CRITICAL_DATA_ERROR

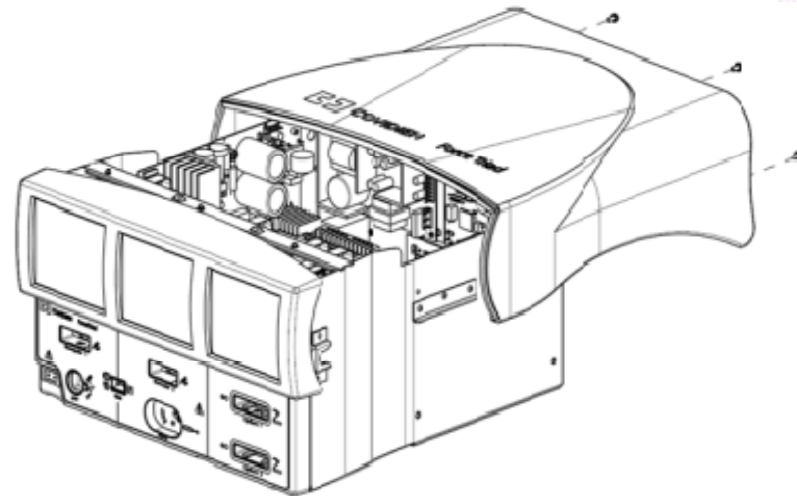
The E274 error code is designated and issued to signify that the system has generated an error during self-test where the unit did not receive critical information required for start-up. This is most commonly seen when calibration is required on the unit.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Scanners](#)
2. [Controller Board](#)
3. [Scanner Cables](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E275 - ERR_NR_MULTI_TASKING_ERROR

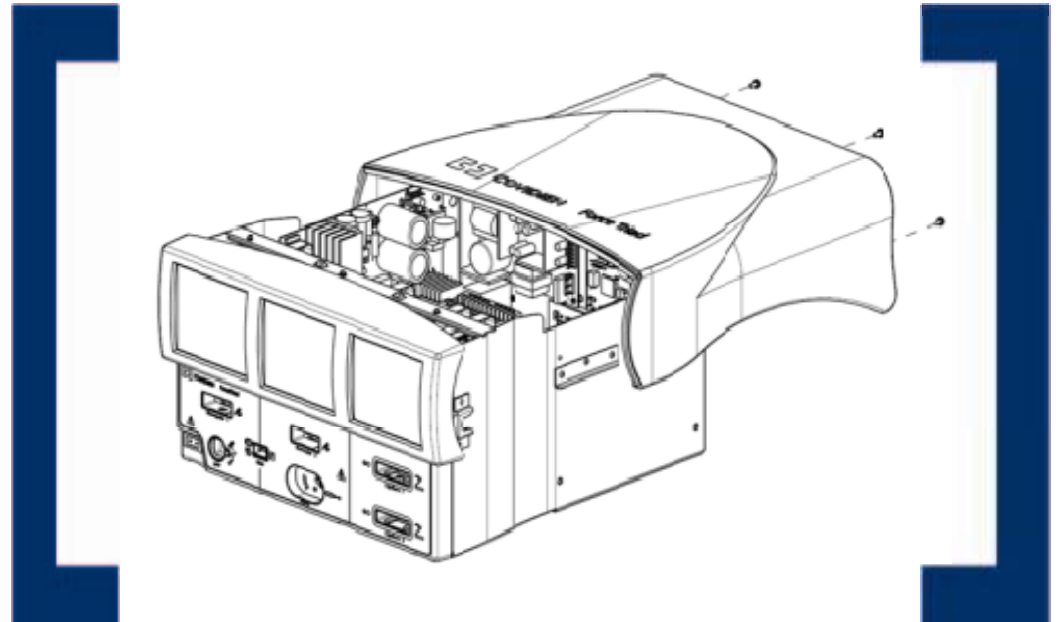
The E275 error code is designated and issued to signify that the system has generated an error during self-test while multi-tasking.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Verify the ribbon cables and FTSW cable connections are securely seated.
4. Perform a level 6 calibration as outlined in the Calibration Section.

E276 - ERR_NR_ANALOG_SENSOR_ERROR

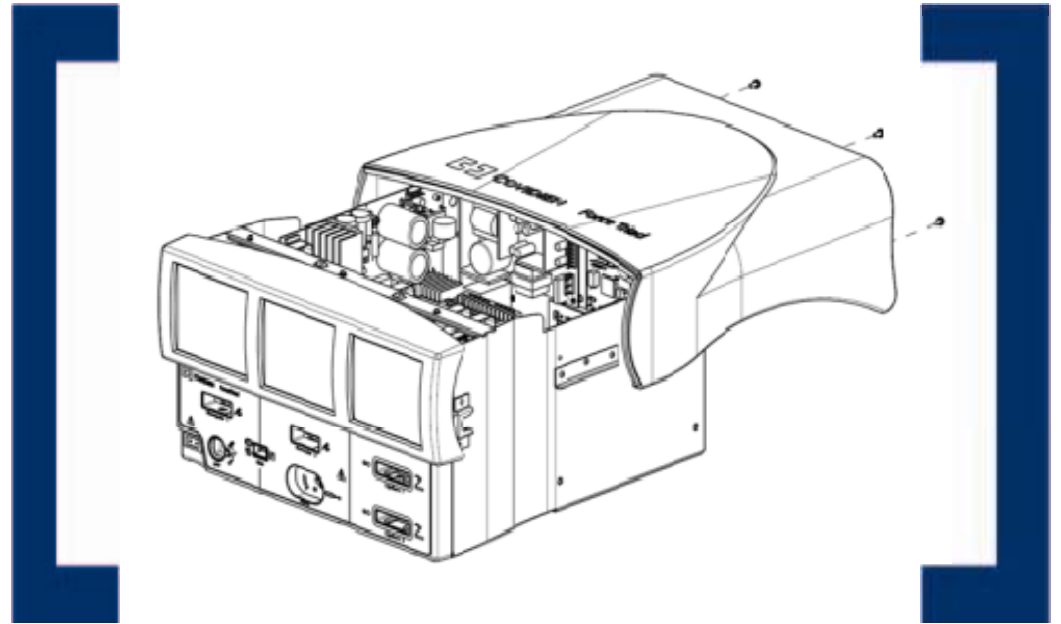
The E276 error code is designated and issued to signify that the system has generated an error during self-test while testing an analog sensor.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [RF Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E277 - ERR_NR_RF_SHUT_DWN_1_ERROR

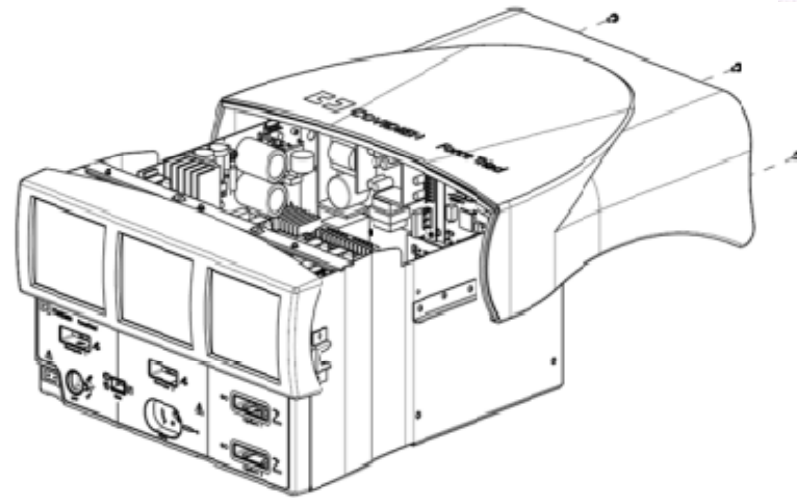
The E277 error code is designated and issued to signify that the system has generated an error during RF self-test #1 while attempting to shutdown the RF generation.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [HVDC Board](#)
2. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E278 - ERR_NR_RF_SHUT_DWN_2_ERROR

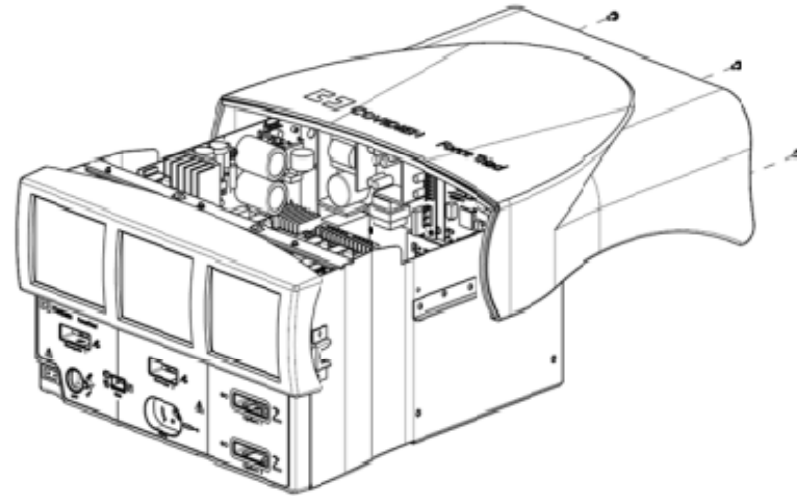
The E289 error code is designated and issued to signify that the system has generated an error during RF self-test #2 while attempting to shutdown the RF generation.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [RF Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E279 - ERR_NR_RF_SHUT_DWN_3_ERROR

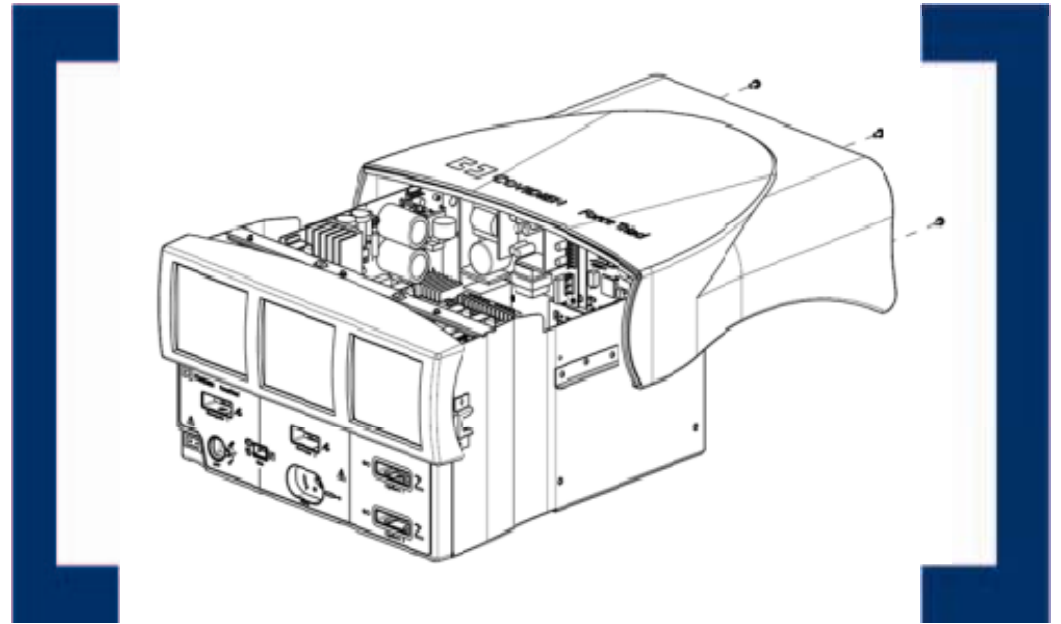
The E279 error code is designated and issued to signify that the system has generated an error during RF self-test #3 while attempting to shutdown the RF generation.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [RF Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E280 - ERR_NR_TIMEBASE_ERROR

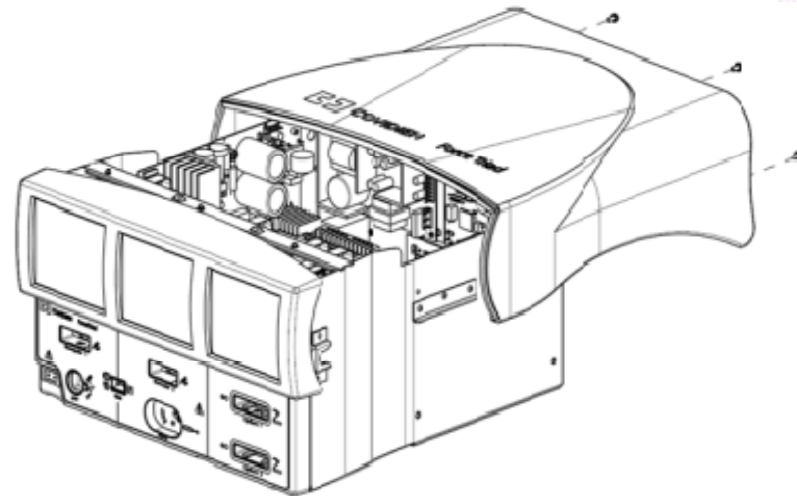
The E280 error code is designated and issued to signify that the system has generated an error during self-test while attempting to compare the time base.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E281 - ERR_NR_SYS_WATCH_DOG_ERROR

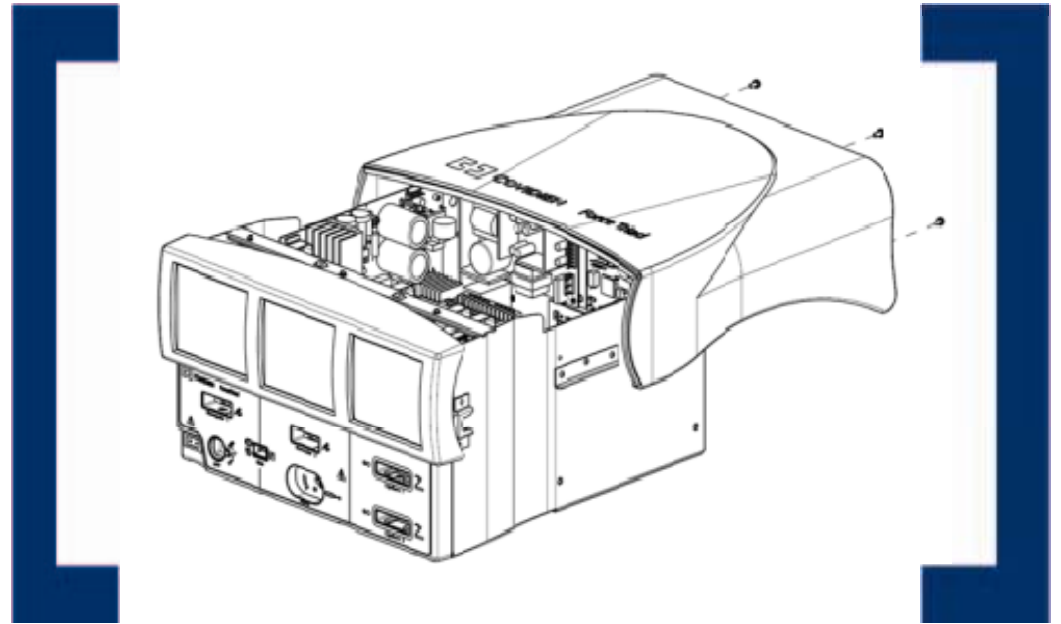
The E281 error code is designated and issued to signify that the system has generated a communication error during self-test.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E282 - ERR_NR_ICL_PROG_ERROR

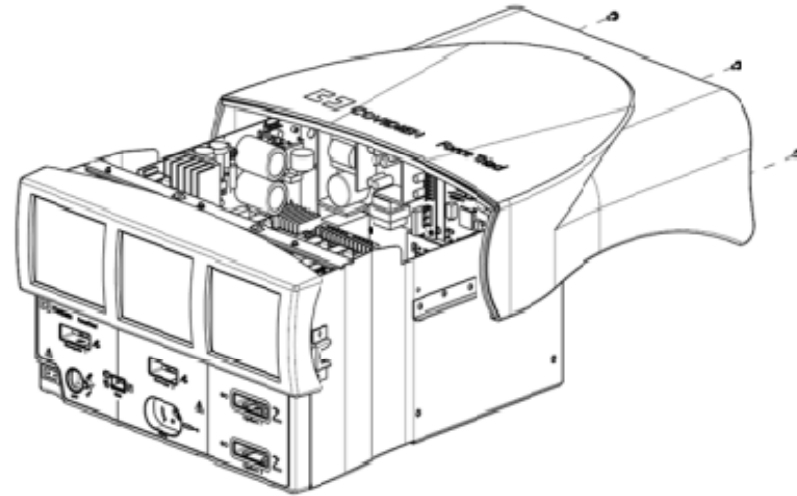
The E282 error code is designated and issued to signify that the system has generated an error during self-test while attempting to pull information from the ICL chip on the controller board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E283 - ERR_NR_RAM_MEMORY_ERROR

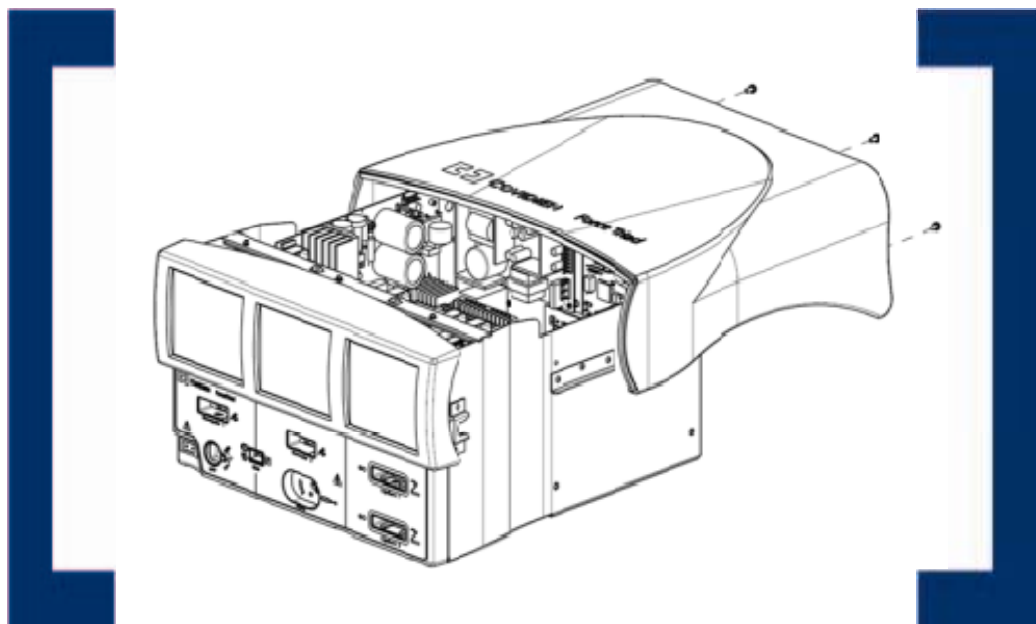
The E283 error code is designated and issued to signify that the system has generated a RAM error during self-test.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E284 - ERR_NR_FLASH_MEMORY_ERROR

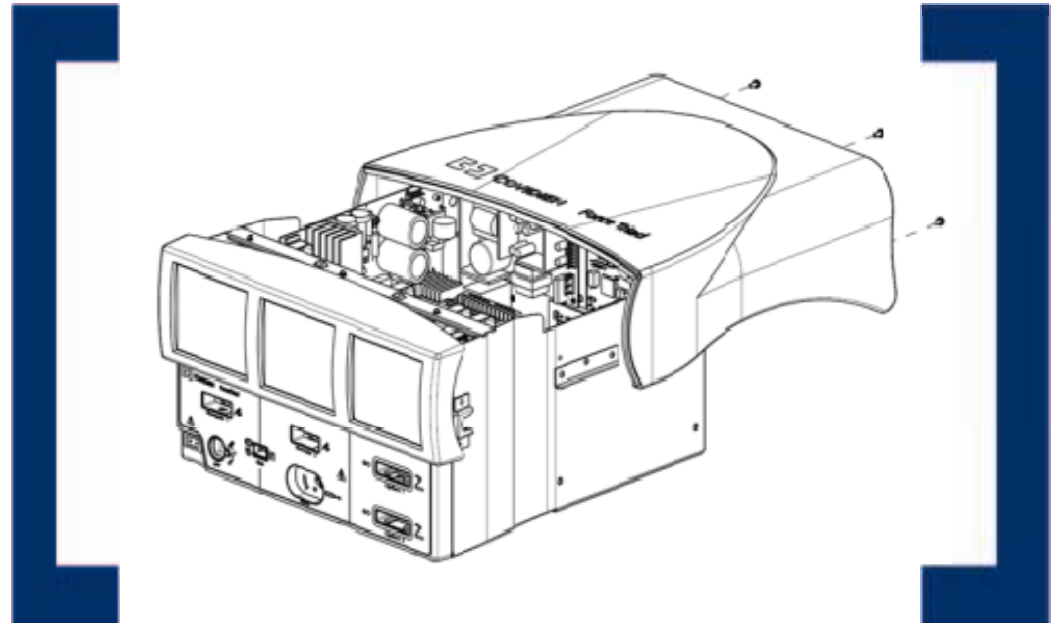
The E284 error code is designated and issued to signify that the system has generated a flash error during self-test.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E285 - ERR_NR_INVALID_CONFIG_DATA

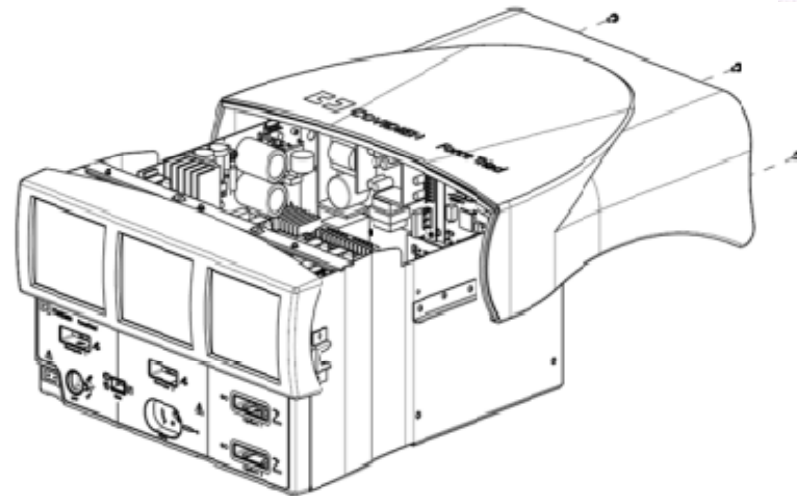
The E285 error code is designated and issued to signify that the system has generated an error during self-test. This particular error is to inform the user the equipment configuration is not valid or there is checksum error within the software.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E286 - ERR_NR_NULL_PTR

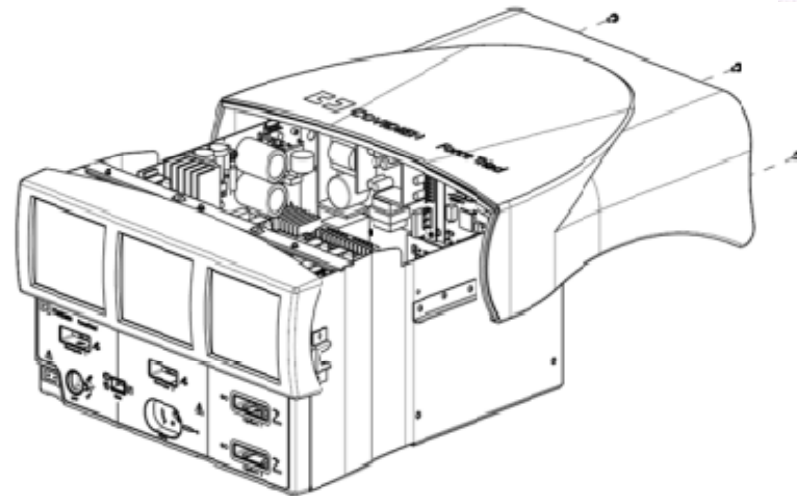
The E286 error code is designated and issued to signify that the system has generated a software error where the null pointer was detected during self-test.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [Displays](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E287 - ERR_NR_AIE

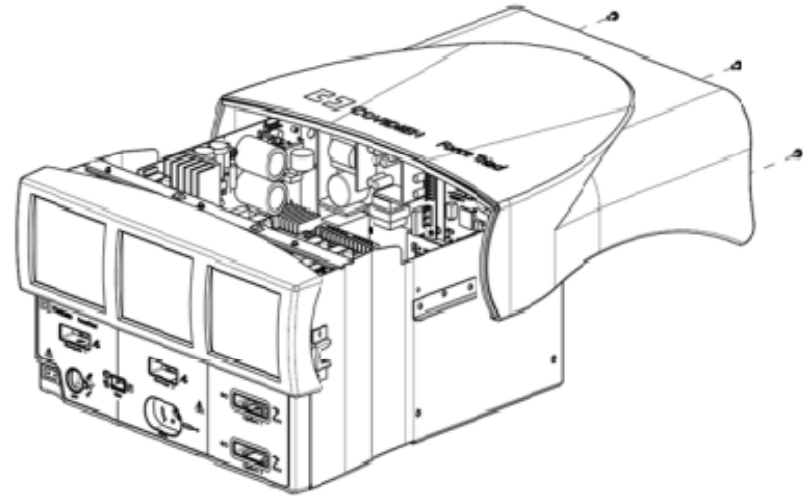
The E287 error code is designated and issued to signify that an absolute integer error has occurred.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E288 - ERR_NR_SENSOR_CLIP

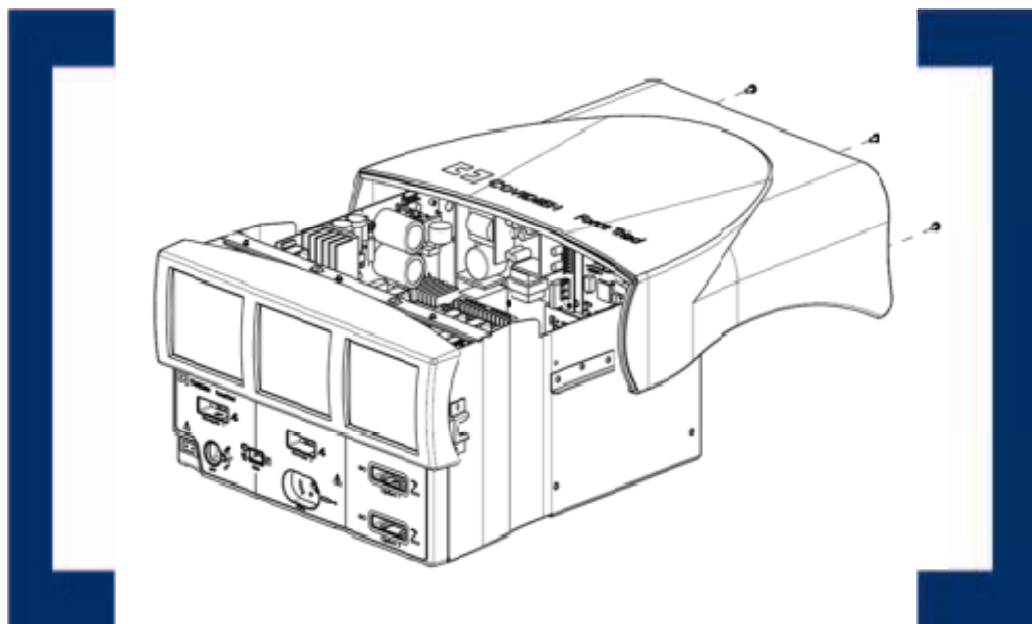
The E288 error code is designated and issued to signify that the system has developed a DSP sensor clip error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [HVDC Board](#)
2. [RF Board](#)
3. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E289 - ERR_NR_SENSOR_COMPARE

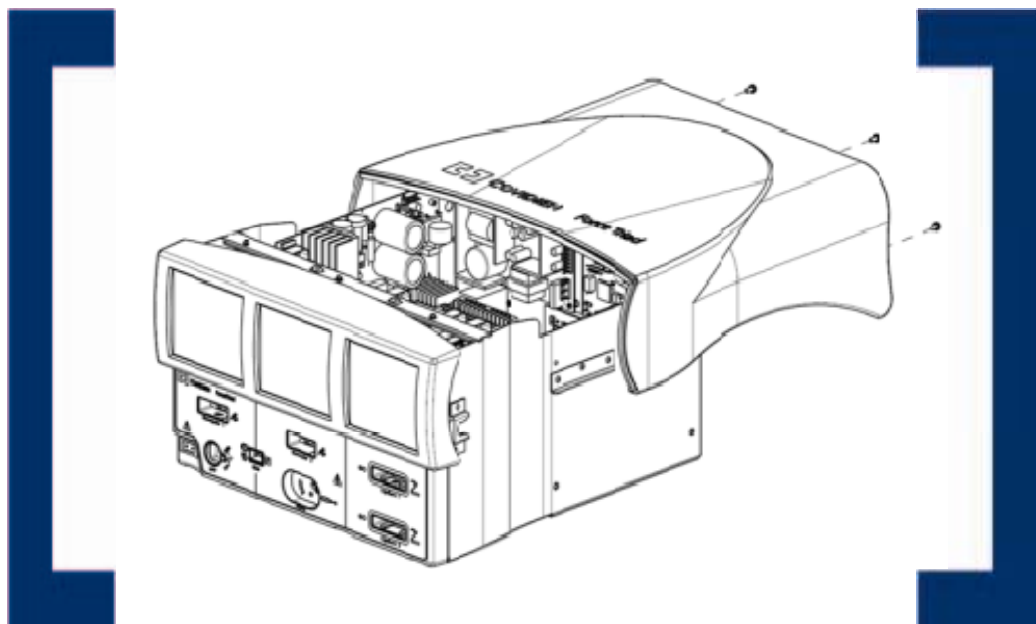
The E289 error code is designated and issued to signify that the sensor comparing the DSPs has an error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [RF Board](#)
3. [HVDC Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.



E290 - ERR_NR_DATA_SAMPLE_ERROR

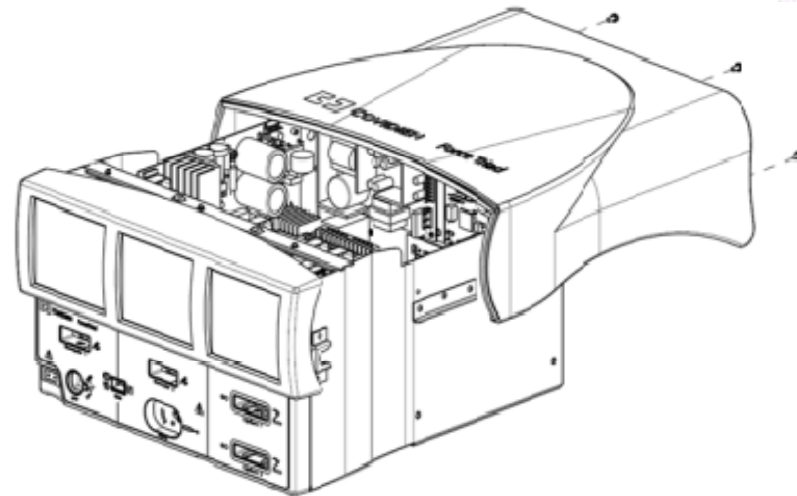
The E290 error code is designated and issued to signify that the system has generated a sampling error while conducting data sampling of the VI.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E291 - ERR_NR_COMM_WD_ERROR

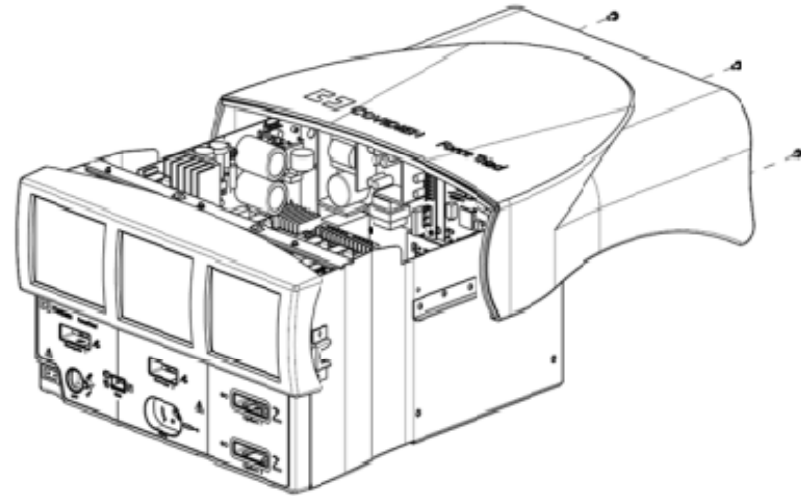
The E289 error code is designated and issued to signify that the system has generated a watchdog (communication) error.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E292 - ERR_NR_DSP_SW_ERROR

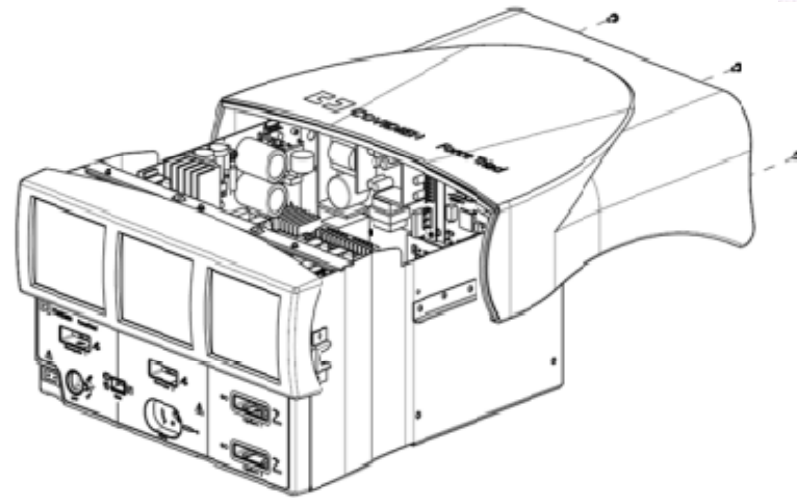
The E292 error code is designated and issued to signify that the system has generated a software error caused by issues with the DSP.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [HVDC Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E293 - ERR_NR_FLASH_ERROR

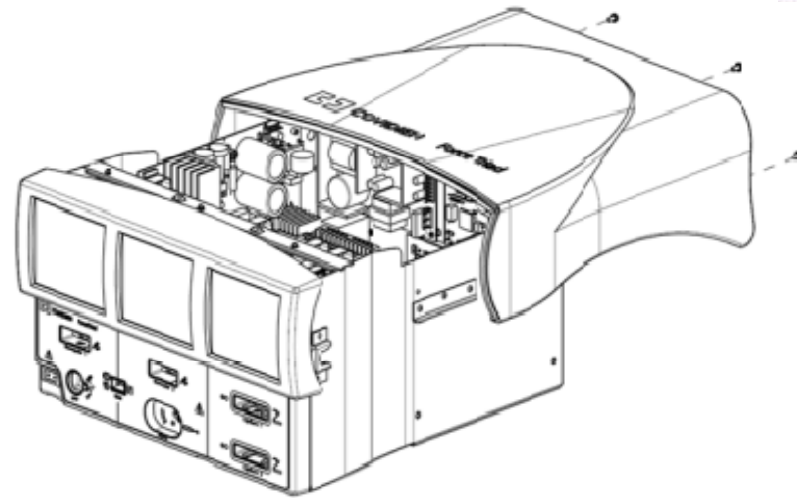
The E293 error code is designated and issued to signify that the system has generated a software error while attempting to write to the FLASH memory.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E294 - ERR_NR_OS_ERROR

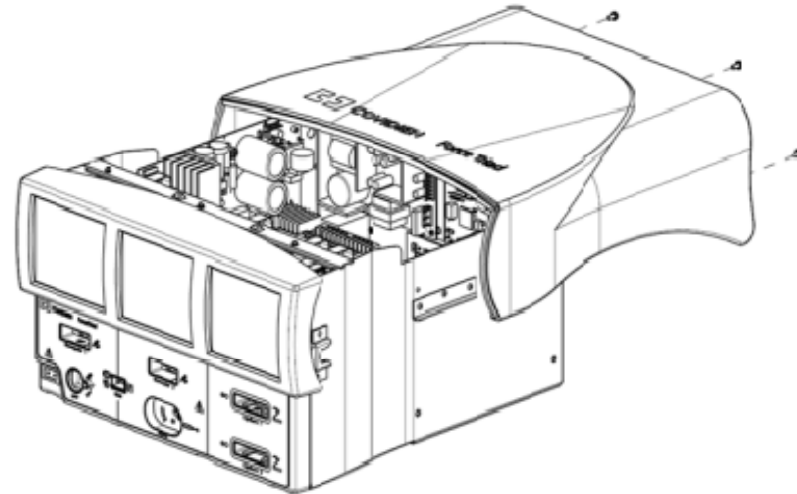
The E294 error code is designated and issued to signify that the system has generated an operating system error in real time.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E295 - ERR_NR_NV_STORE_ERROR

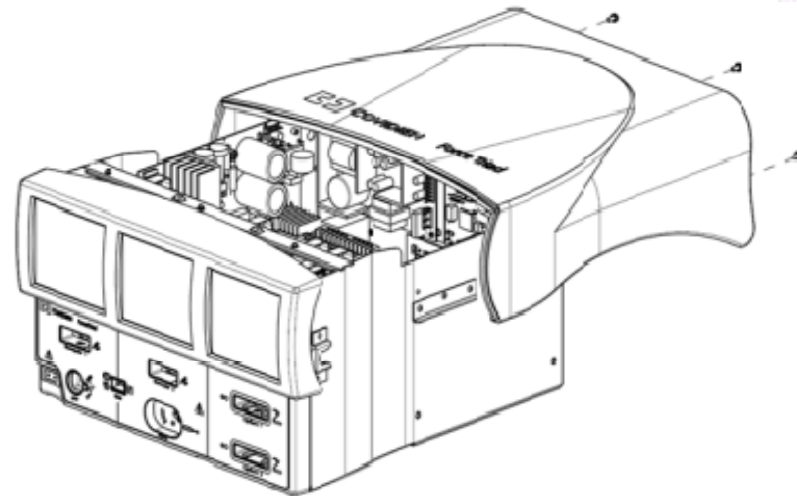
The E295 error code is designated and issued to signify that the system has generated a software error while attempting to write to the NV store.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E296 - ERR_NR_ICL_HB_ERROR

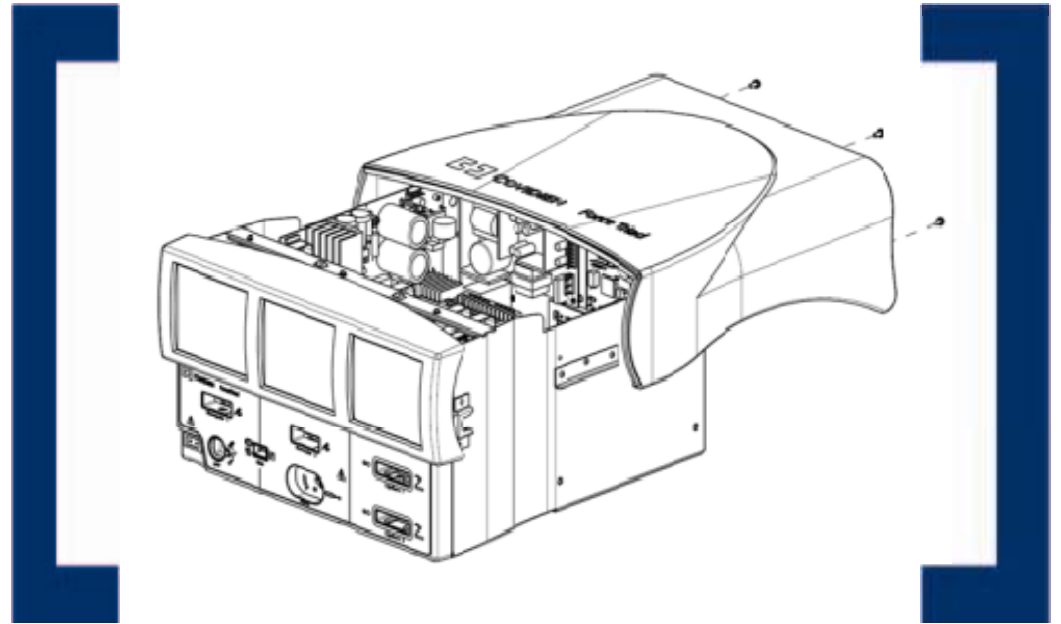
The E289 error code is designated and issued to signify that the system has generated an ICL error while monitoring the ICL heartbeat.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E297 - ERR_NR_MSG_VIEWER_CTOR_FAIL

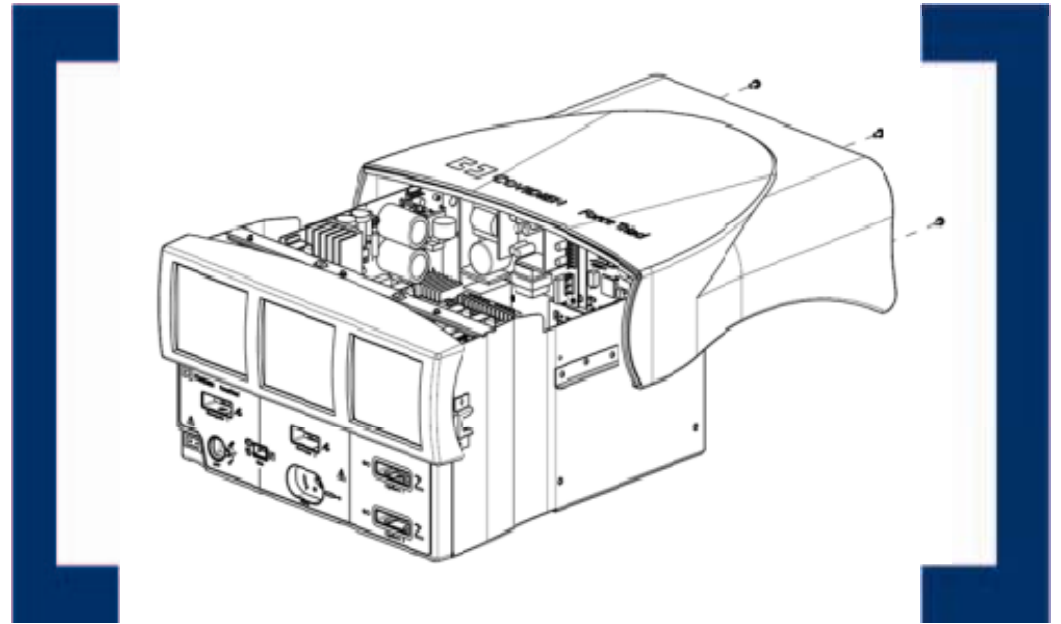
The E297 error code is designated and issued to signify that the system has generated a software error caused by the failed construction of the message viewer.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E298 - ERR_NR_SYS_CTRL_REQ_FAIL

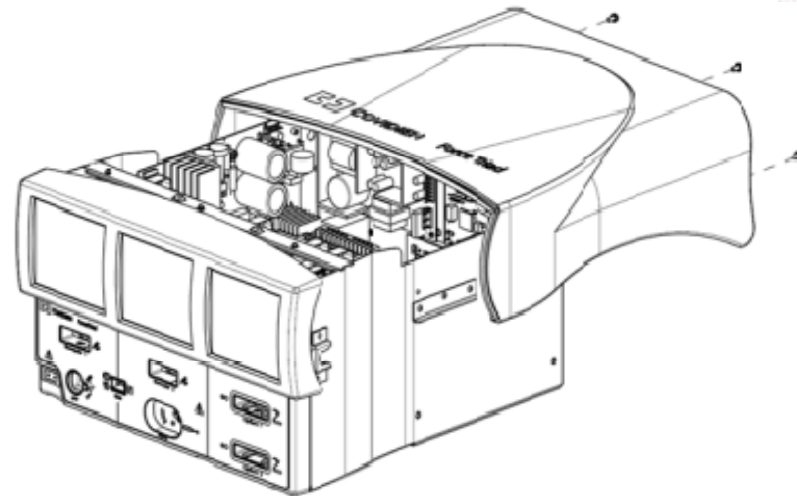
The E298 error code is designated and issued to signify that the system has generated a software error due to the system denying the request to bring up the main menus on the controller.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E299 - ERR_NR_LKG_LIMIT

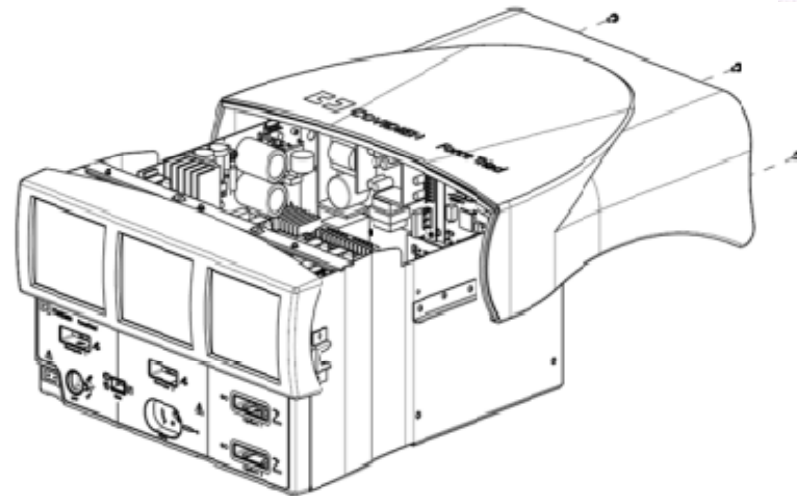
The E299 error code is designated and issued to signify that the system has generated an error due to leakage on the sensor compare for DSP 2.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [RF Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E300 - ERR_NR_BAD_SCANNER

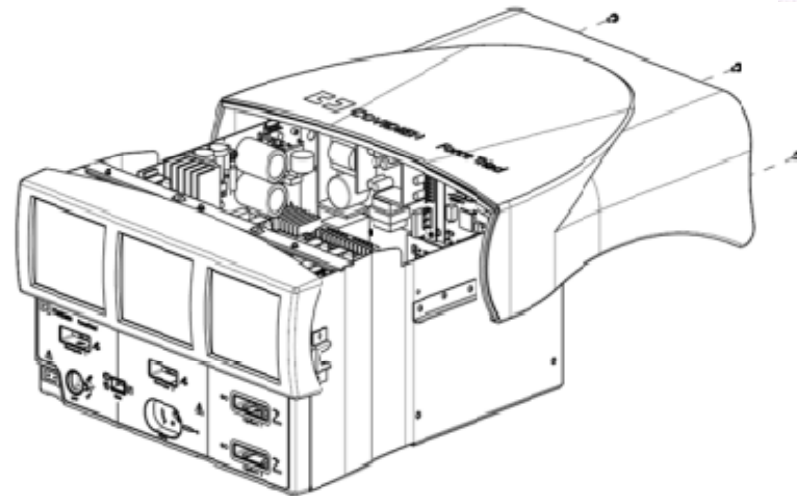
The E300 error code is designated and issued to signify that the system has generated an error caused by a bad or malfunctioning scanner.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Clean the scan stand label
3. Clean the glass above scan stand label
4. Verify the LED's are functioning
5. Capture a scan stand image
6. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Scanners](#)
2. [Scanner Cables](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Clean the scan stand label and glass with a mild solvent and rag.
4. Verify the LED's are functioning as expected.
5. Capture a scan stand image:
Main Menu→Service→Diagnostics→Bar Code Image

E301 - ERR_NR_LOW_BATTERY

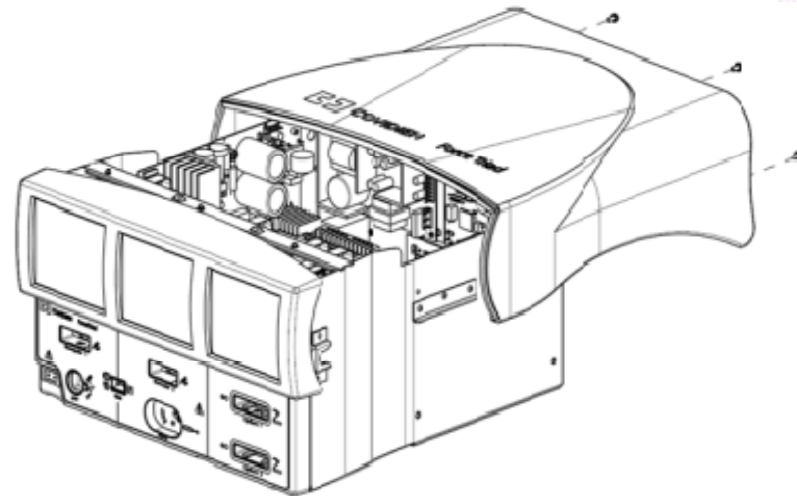
The E301 error code is designated and issued to signify that the system has generated an error due to the life of the battery on the controller board.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E302 - ERR_NR_IO_ERROR

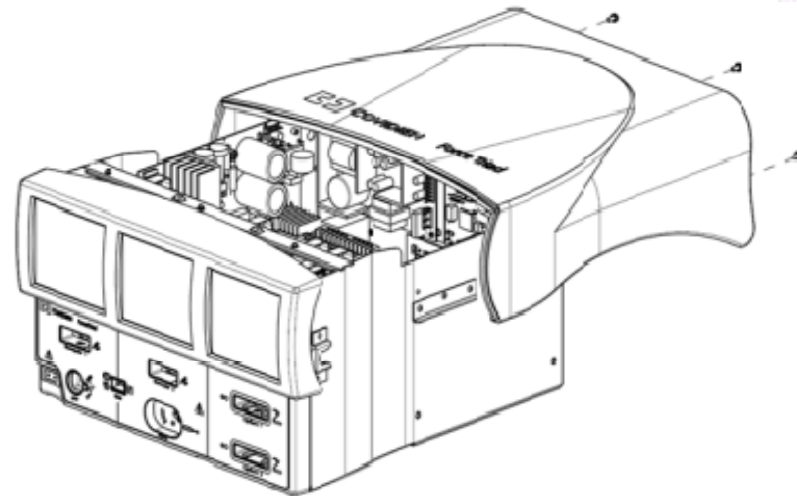
The E302 error code is designated and issued to signify that the system has generated a software error due to a failed attempt to map the I/O memory.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)
2. [Low Voltage Power Supply](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E303 - ERR_NR_DSP_VERIFY_ERROR

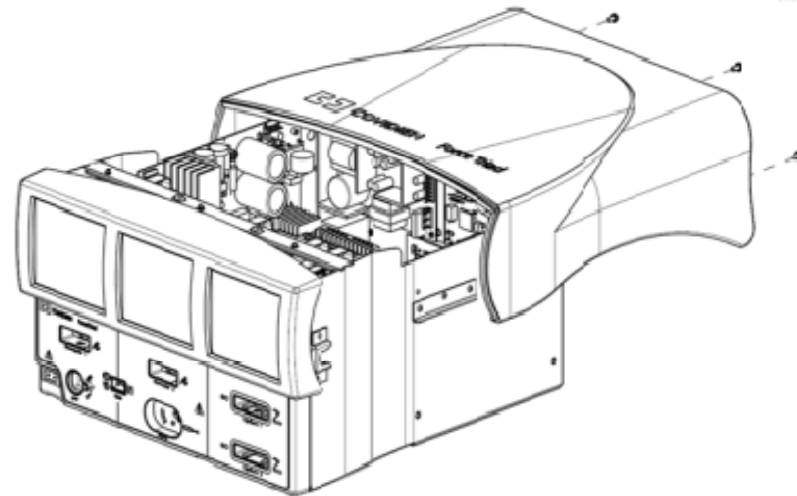
The E303 error code is designated and issued to signify that the system has generated a software error due to a failed verification of the DSP.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E304 - ERR_NR_SCREEN_STACK_ERROR

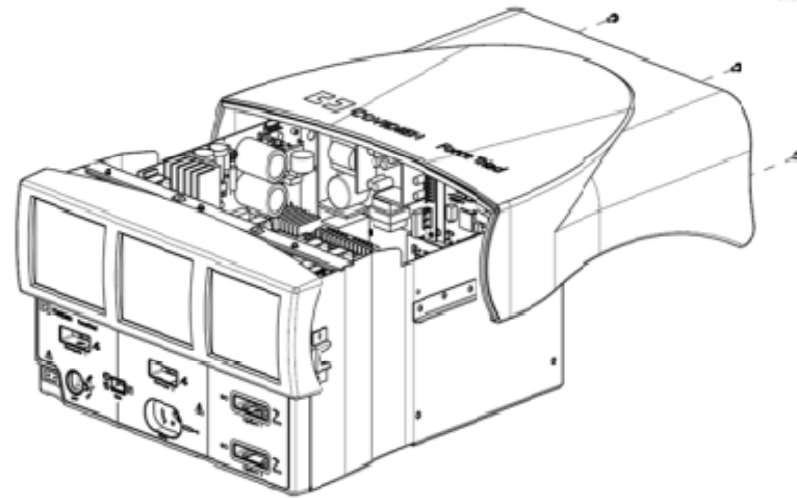
The E304 error code is designated and issued to signify that the system has generated a software error due to a screen stack manipulation in the AppScreenBase.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Displays](#)
2. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E305 - ERR_NR_ROM_ERROR

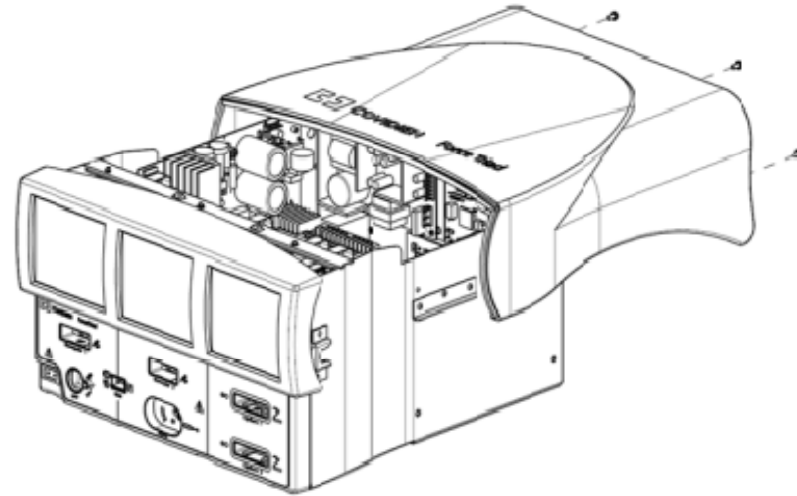
The E305 error code is designated and issued to signify that the system has generated a software error during the self-test caused by a ROM failure.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E306 - ERR_NR_ICL_COMM_LINK_ERROR

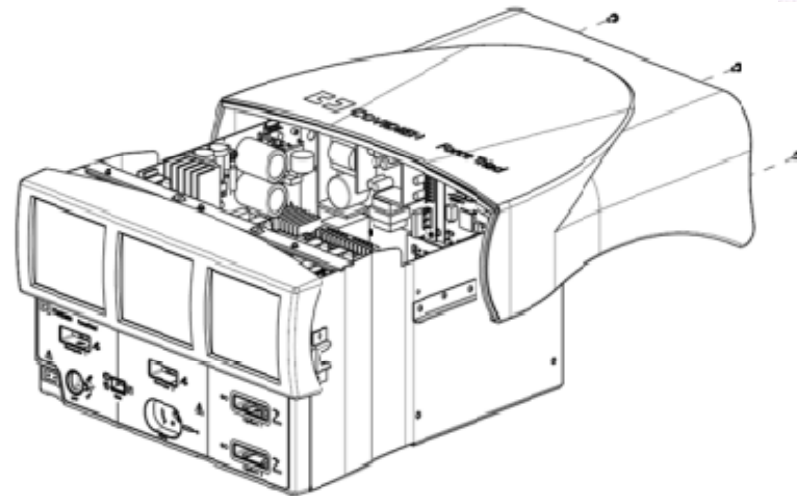
The E306 error code is designated and issued to signify that the system has generated an error due to a failed ICL communication link test.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Foot Switch Board](#)
2. [Low Voltage Power Supply](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Verify the ribbon cables and FTSW cable connections are securely seated.
4. Perform a level 6 calibration as outlined in the Calibration Section.

E307 - ERR_NR_RF_TEST4_ERROR

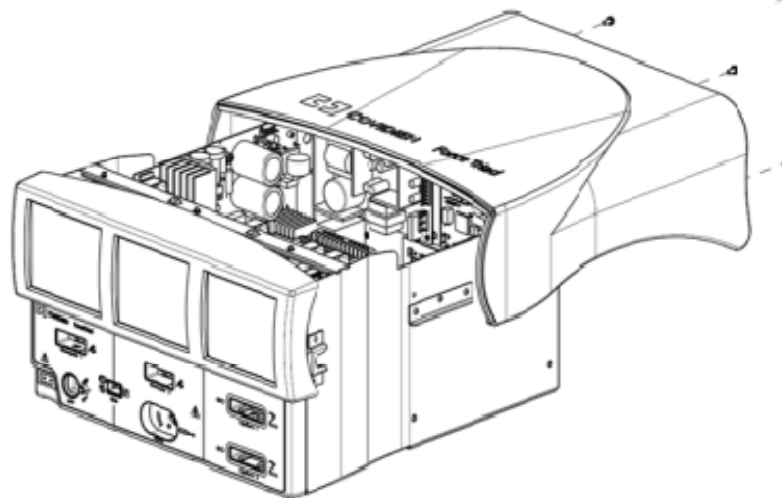
The E307 error code is designated and issued to signify that the system has generated an error due to a failure of shutting down the RF.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [RF Board](#)
2. [Controller Board](#)
3. [HVDC Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E308 - ERR_NR_UART_LOOP_BIT

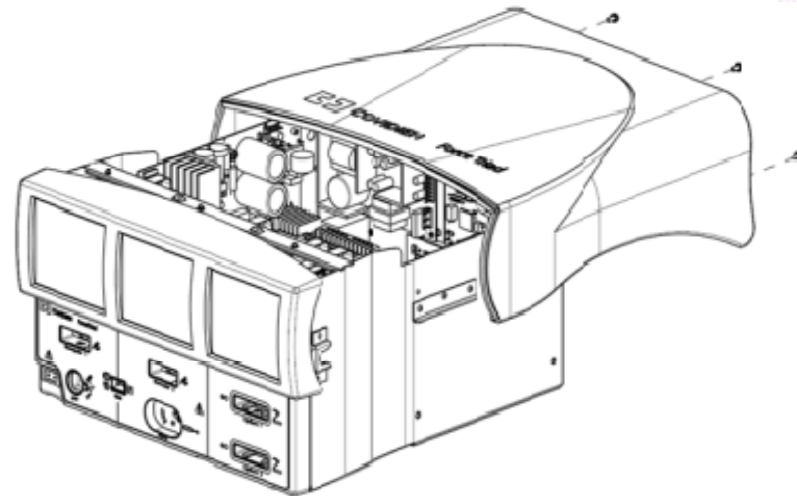
The E308 error code is designated and issued to signify that the system has generated an error due to a loopback feature being turned on.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Scanners](#)
2. [Scanner Cables](#)
3. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E309 - ERR_NR_RDM_INVALID_WINDOW

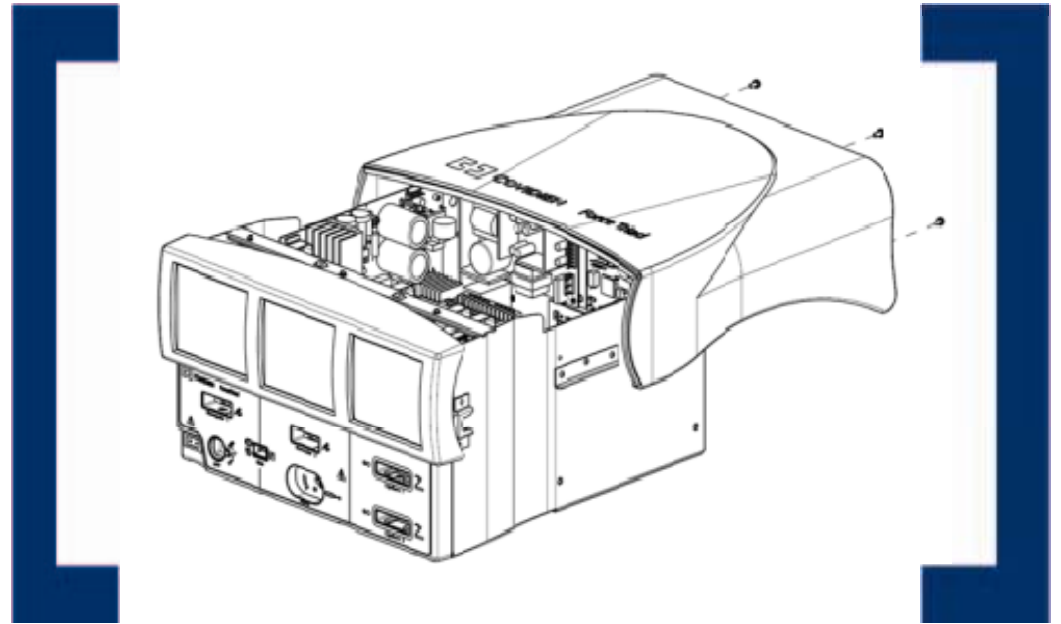
The E309 error code is designated and issued to signify that the system has generated an error due to an invalid window pointer signal generated by the remote controller.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Displays](#)
2. [Displays Cables](#)
3. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E310 - ERR_NR_RDM_INVALID_FIELD_LIST

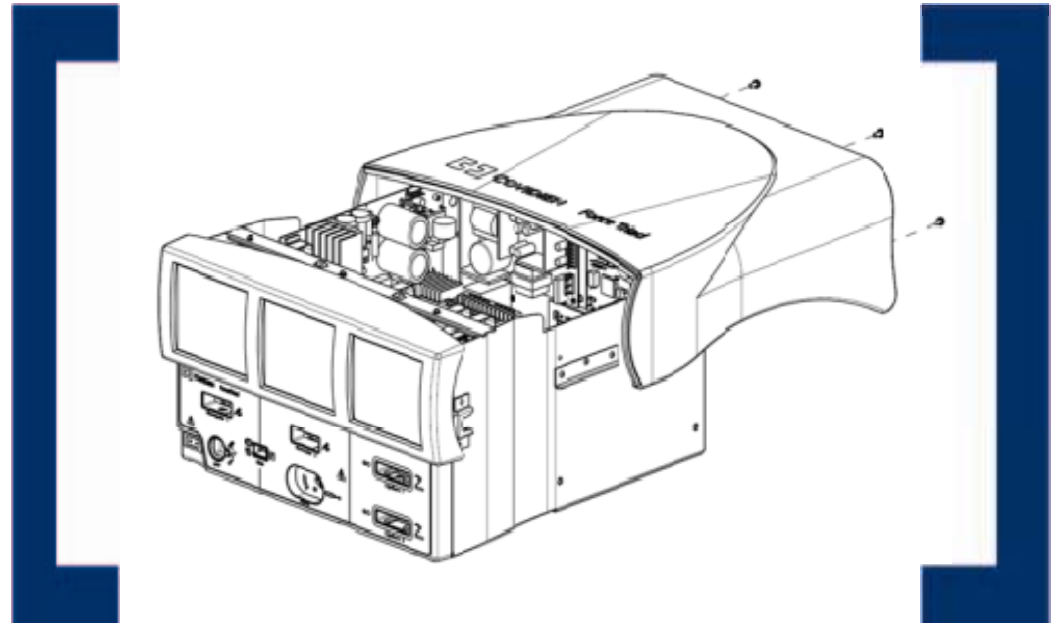
The E310 error code is designated and issued to signify that the system has generated an error due to an invalid field list signal generated by the remote controller.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Displays](#)
2. [Displays Cables](#)
3. [Controller Board](#)



NON-COMPONENT ACTIONS INSTRUCTION

1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E311 - ERR_NR_INVALID_RF_HDW_CONFIG

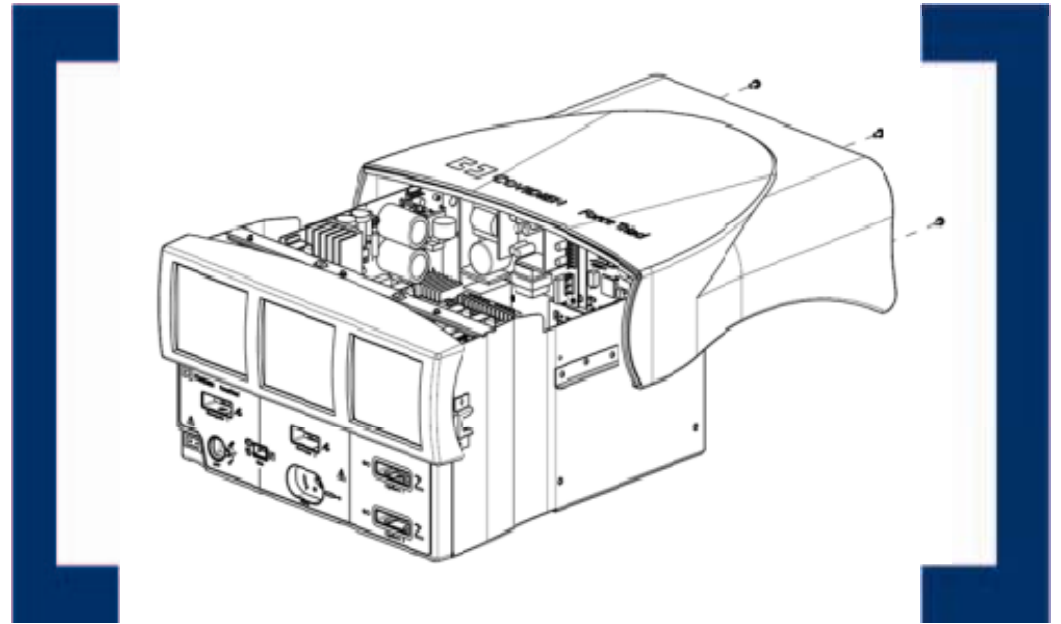
The E311 error code is designated and issued to signify that the system has generated an error due to the HOST receiving a combination of hardware versions that are invalid.

NON-COMPONENT ACTIONS

1. Power cycling the system
2. Performing a full recalibration

LEADING COMPONENT REPLACEMENTS

1. [Controller Board](#)




NON-COMPONENT ACTIONS INSTRUCTION

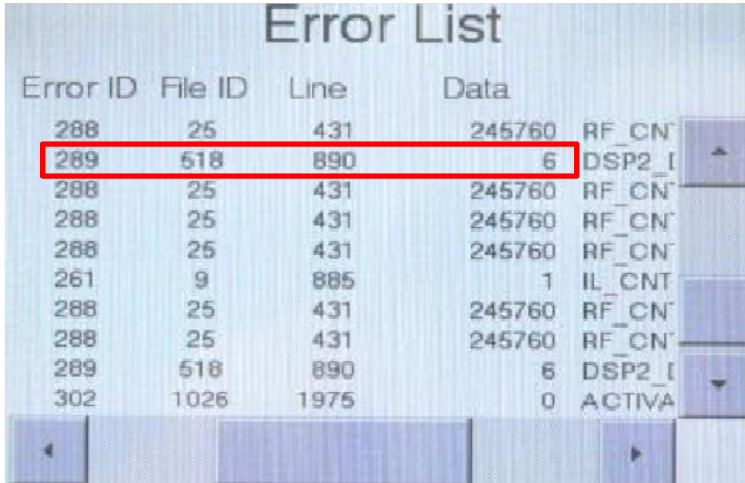
1. Power Cycle the unit and allow the system to perform the self-test.
2. Remove the cover to the ForceTriad system and inspect the system boards ensuring that the boards are properly seated within the unit and that all cables are also securely connected.
3. Perform a level 6 calibration as outlined in the Calibration Section.

E287 & E289 Additional Troubleshooting

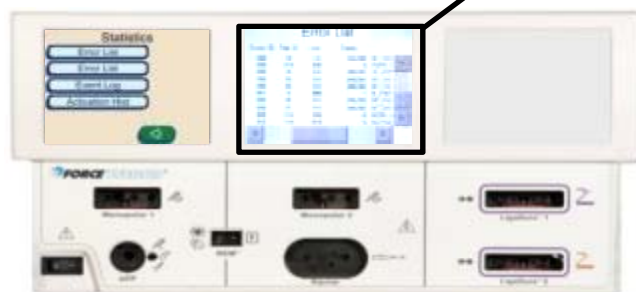
Error codes E287 & E289 can have additional information about the true root cause of the failure listed in the Error List.

Click the  on the right screen of the ForceTriad system. Select "Service" → "Statistics" → "Error List".

On the Error List, locate the most recent Error Code ("Error ID"). For E287 & E289, the information in the "Data" column can help to isolate the true issue. Using the table below and the information listed in the "Data" column, you can help to isolate the root cause to one of two boards.



Error ID	File ID	Line	Data
288	25	431	245760 RF_CN
289	518	890	6 DSP2_I
288	25	431	245760 RF_CN
288	25	431	245760 RF_CN
261	9	885	1 IL_CNT
288	25	431	245760 RF_CN
288	25	431	245760 RF_CN
289	518	890	6 DSP2_I
302	1026	1975	0 ACTIVA



E287 & E289 Fault Isolation

Data Code	Likely Issue
1 – Voltage Issue	Controller Board
2 – Current Issue	Controller Board
3 – Power Average Issue	Controller Board
5 – Leakage Issue	RF Board
6 – Phase Issue	RF Board

Basic System Service

All basic system service can be accomplished with a #2 Phillips screwdriver, an anti-static wrist strap, a calibration kit, and a simple workspace. The outlined service components below are statistically the leading system repair components across all system failures. Each error code a system may give you has its own unique, higher probability components and components should be replaced as outlined in the troubleshooting section of this guide.

COMPONENT REPLACEMENT PROCEDURES

Controller Board

RF Board

HVDC Board

LVPS

Steering Relay Board

System Displays

Display Cables

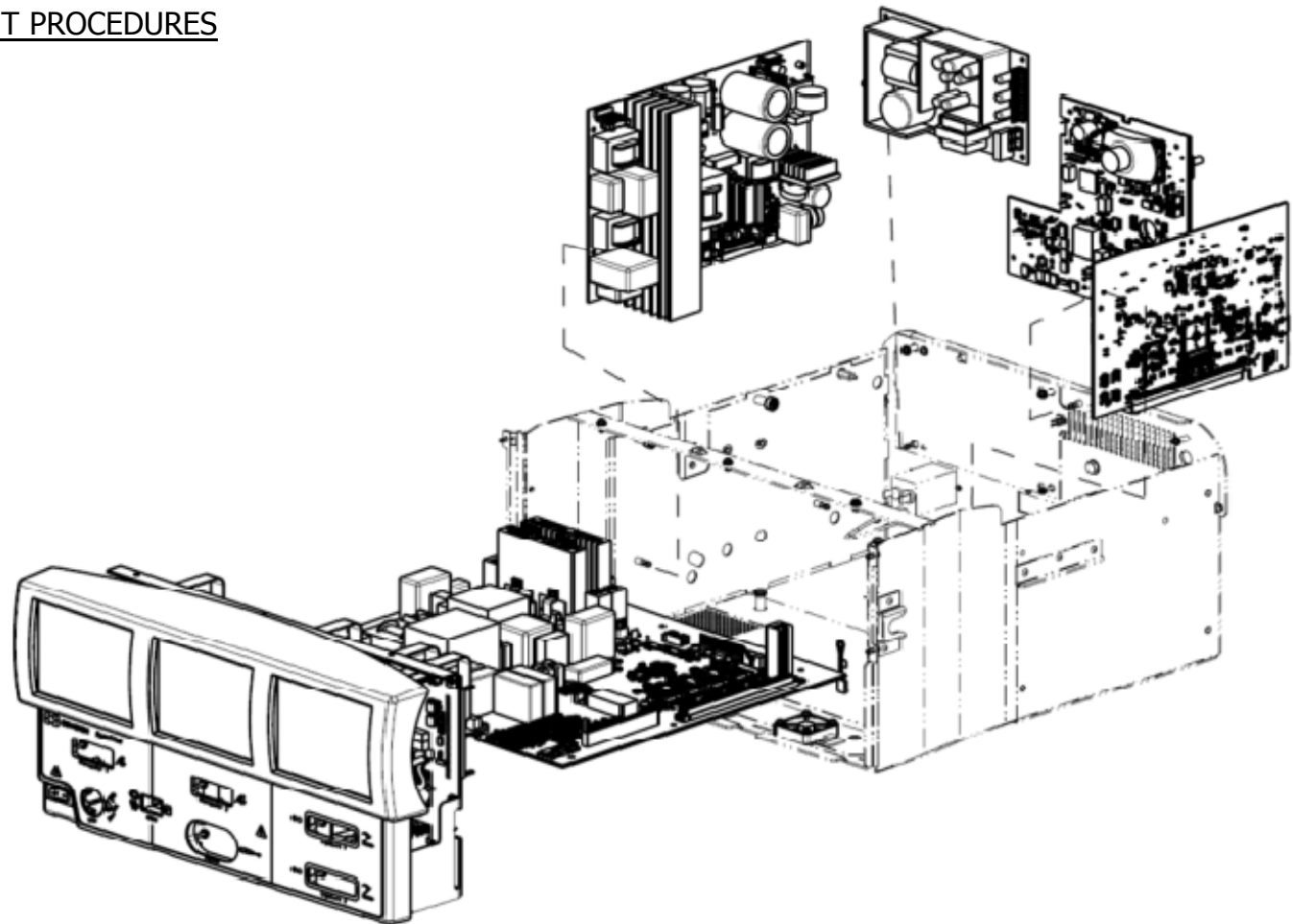
System Scanners

Scanner Cables

Foot Switch Board

System Fans

Display Inverter



Replacing the Controller Board

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 6 calibration.

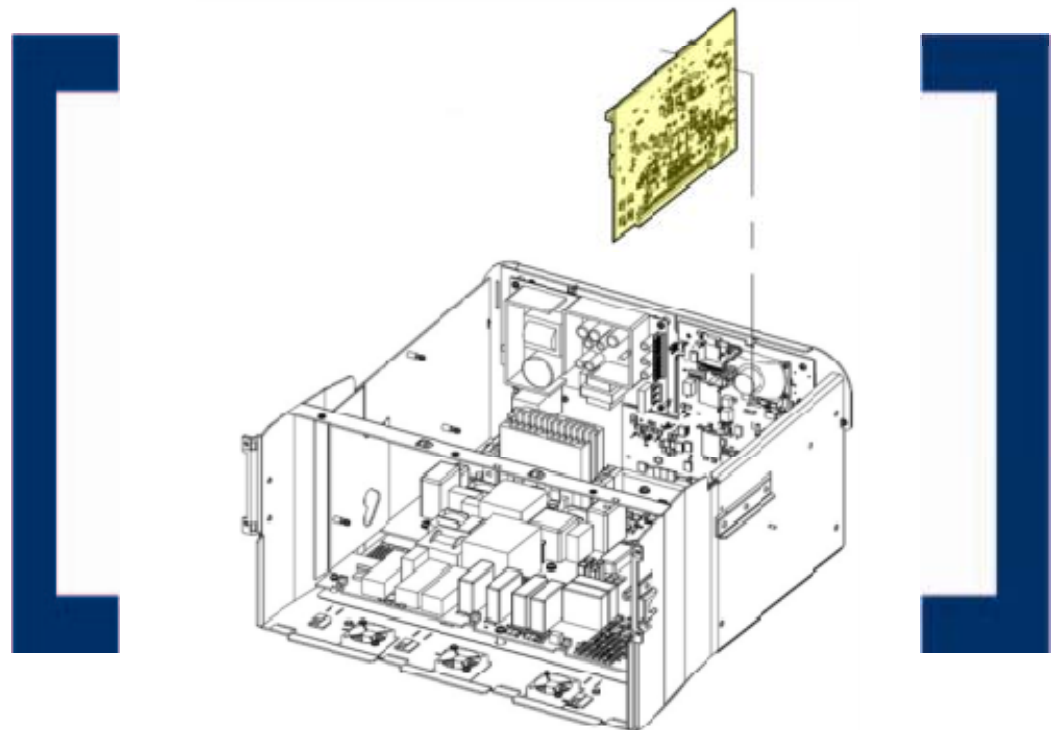
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBA's by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBA's.



REPLACING THE CONTROLLER BOARD

1. Remove the cover to the ForceTriad system.
2. Remove the single mounting screw with a #2 Phillips screwdriver.
3. Remove the cable assemblies and Ethernet cable from the board.
4. Carefully remove the board and replace with new board.
5. Reconnect all cable assemblies, Ethernet cable, and mounting screw.
6. Perform a level 6 calibration as outlined in the Calibration Section.
7. Contact customer service with your system serial number & request a serial number packet at: valleylab.technicalservice@covidien.com.
8. Once received, connect the system to Valleylab Exchange for upload.

Replacing the RF Board

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 5 calibration.

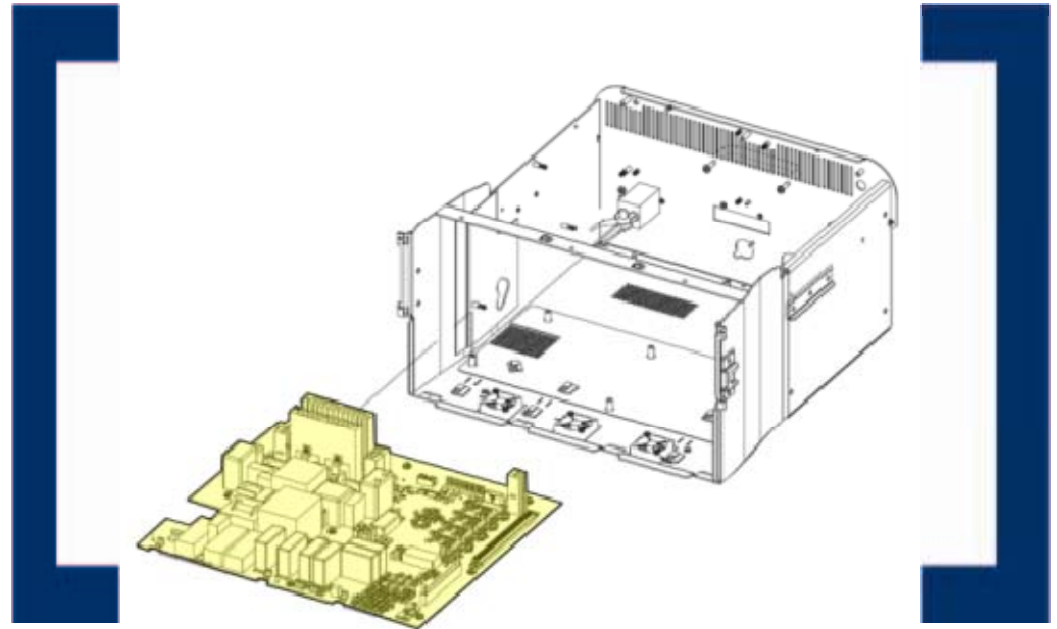
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE RF BOARD

1. Remove the cover to the ForceTriad system.
2. Remove the Controller Board, HVDC Board, & Front Panel Assembly in accordance with the Service Manual.
3. Remove the cable assemblies from the board.
4. Remove nine securing screws holding the board to the chassis.
5. Carefully remove the board and replace with new board.
6. Reconnect all cable assemblies, replace the mounting screws, and reinstall the three previously removed items.
7. Perform a level 5 calibration as outlined in the Calibration Section.

Replacing the HVDC Board

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 4 calibration.

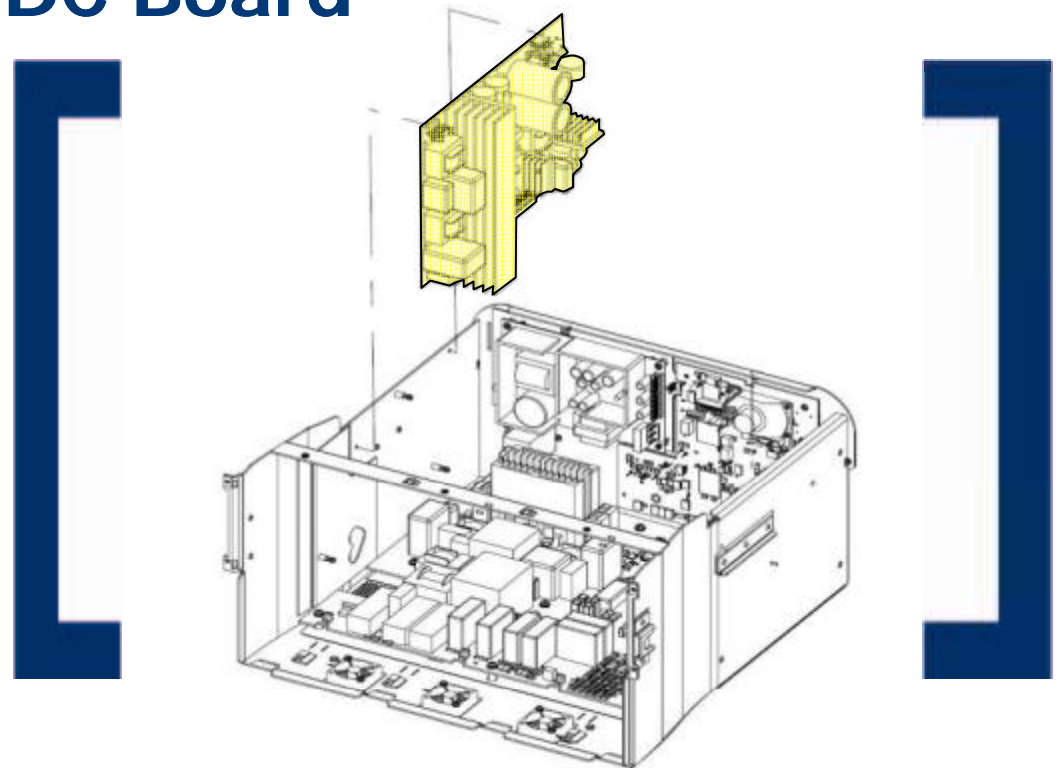
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE HVDC BOARD

1. Remove the cover to the ForceTriad system.
2. Remove the cable assemblies from the board.
3. Remove single securing screw holding the board to the chassis.
4. Carefully remove the board and replace with new board.
5. Reconnect all cable assemblies and replace the mounting screw.
6. Perform a level 4 calibration as outlined in the Calibration Section.

Replacing the Low Voltage Power Supply

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 0 calibration.

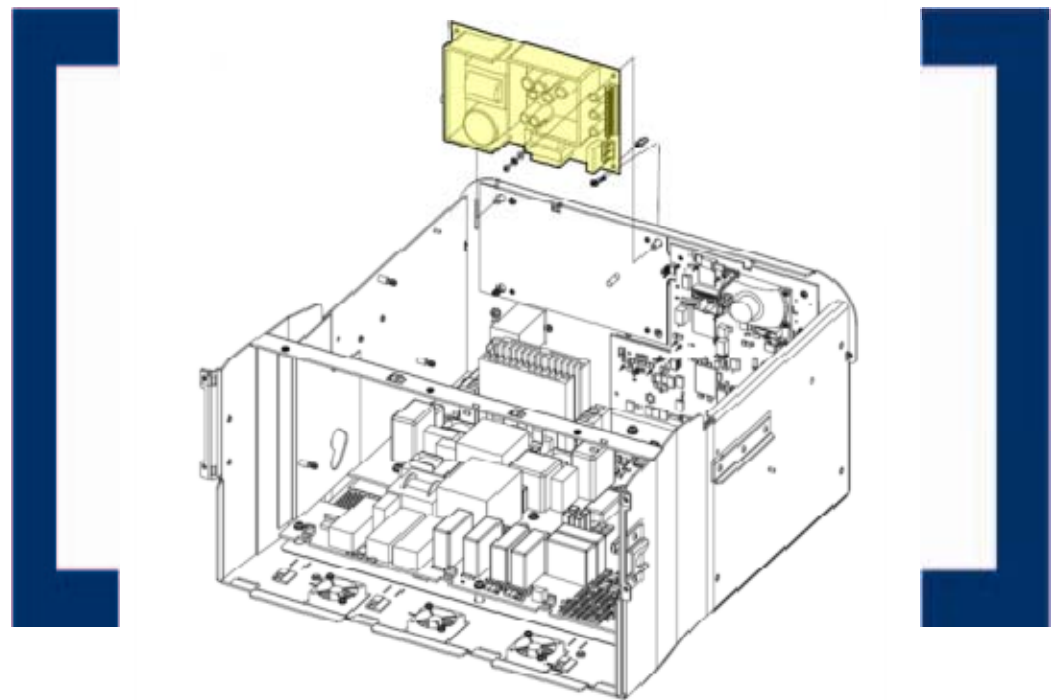
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE LVPS

1. Remove the cover to the ForceTriad system.
2. Remove the three mounting screw holding the board to the chassis.
3. Remove the cable assemblies from the board.
4. Carefully remove the board and replace with new board.
5. Reconnect all cable assemblies and replace the three mounting screws ensuring the nylon screw is mounted on the lower right corner.
6. Perform a level 0 calibration as outlined in the Calibration Section.

Replacing the Steering Relay Board

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 5 calibration.

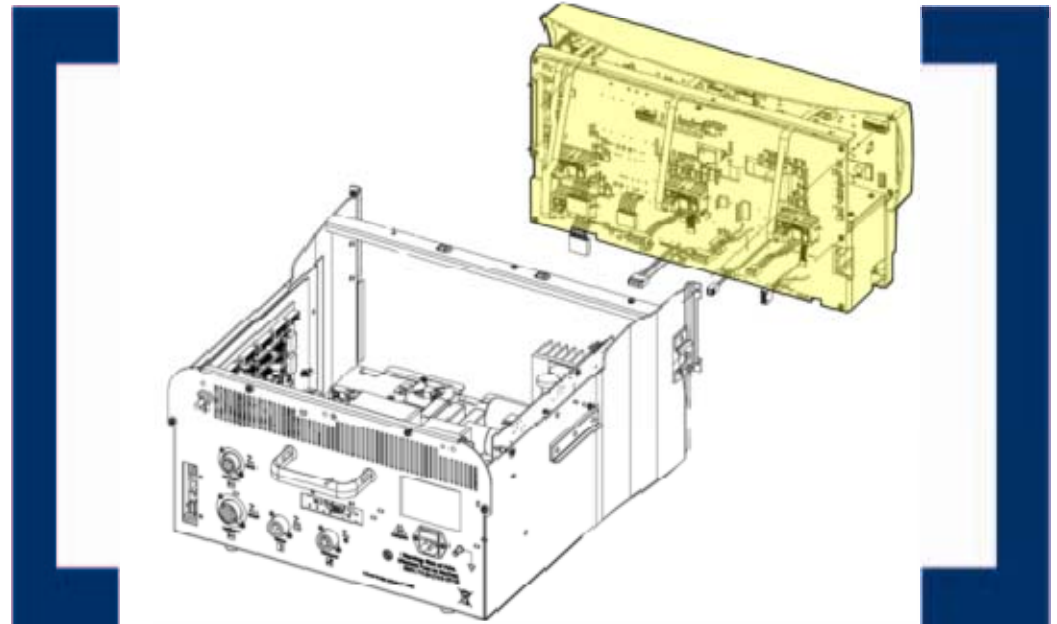
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE STEERING RELAY BOARD

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly.
3. Remove the cable assemblies from the board.
4. Remove the four mounting screw holding the board to the chassis.
5. Carefully remove the board and replace with new board.
6. Reconnect all cable assemblies, replace the four mounting screws, and re-install the front panel assembly.
7. Perform a level 5 calibration as outlined in the Calibration Section.

Replacing the System Displays

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 3 calibration.

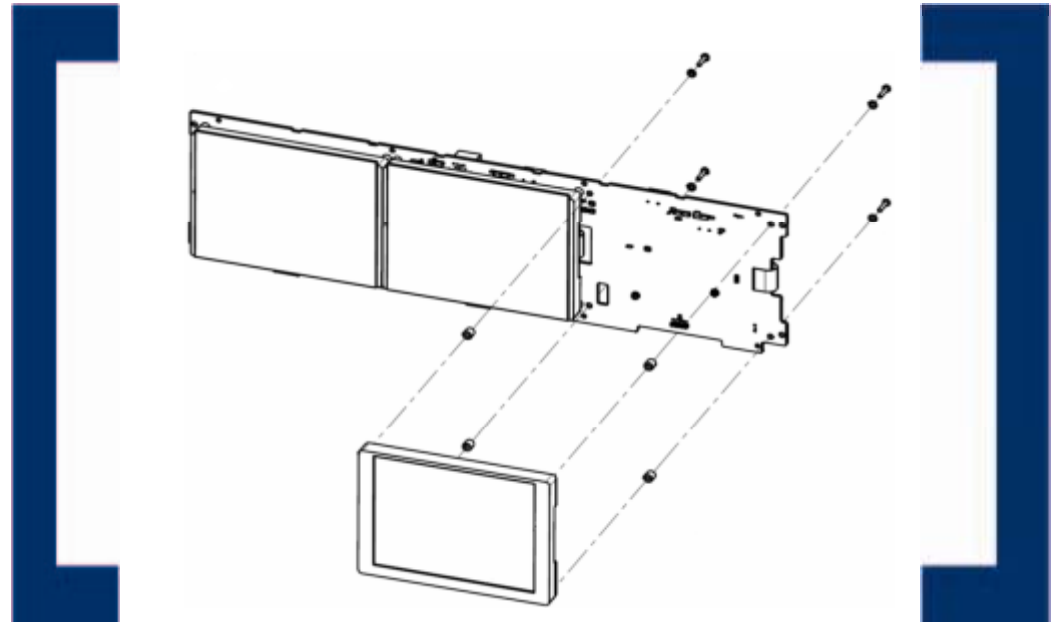
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE DISPLAYS

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly.
3. Remove the Steering Relay Board.
4. Remove the four mounting screw holding the display to the housing.
5. Carefully remove the display and replace with new display.
6. Replace the four mounting screws, re-install the steering relay board, and re-install the front panel assembly.
7. Perform a level 3 calibration as outlined in the Calibration Section.

Replacing the System Display Cables

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 3 calibration.

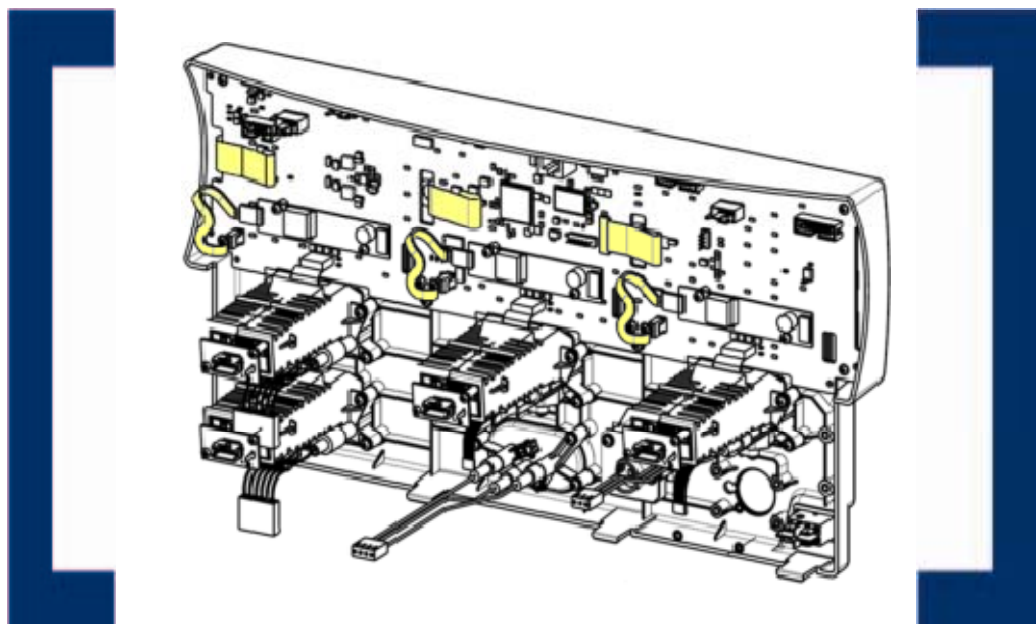
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE DISPLAY CABLES

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly and Steering Relay board.
3. Carefully remove the display cables and replace with new display cables.
4. Re-install the front panel assembly, steering relay board, and replace the cover.
5. Perform a level 3 calibration as outlined in the Calibration Section.



Replacing the System Scanners

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 1 calibration.

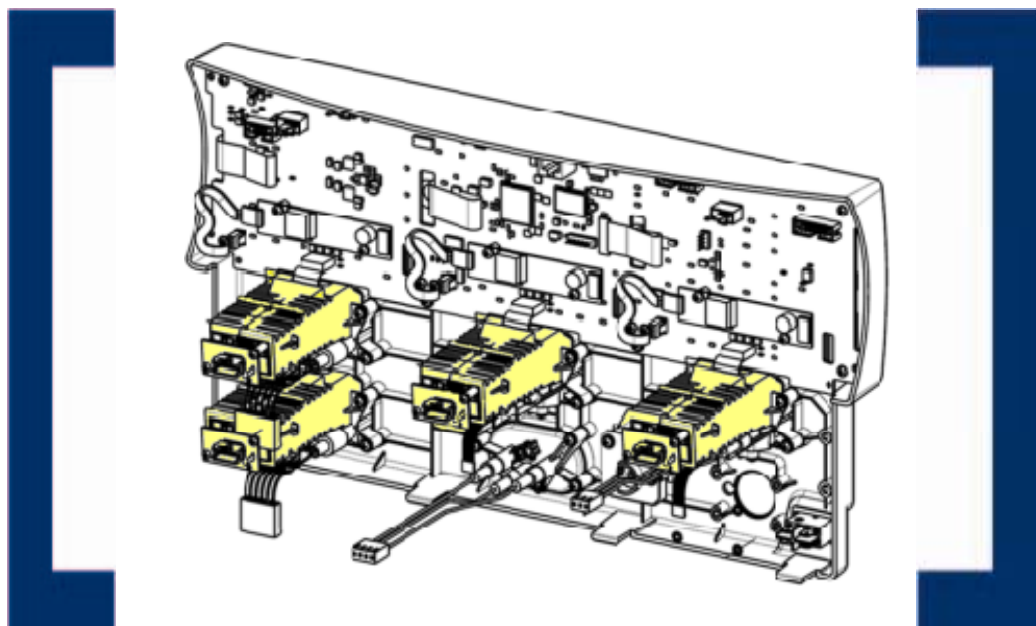
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE SCANNERS

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly.
3. Remove the Steering Relay Board.
4. Remove the two mounting screw holding the scanner to the housing.
5. Carefully remove the scanner and replace with new scanner.
6. Replace the two mounting screws, re-install the steering relay board, and re-install the front panel assembly.
7. Perform a level 1 calibration as outlined in the Calibration Section.

Replacing the System Scanner Cables

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 1 calibration.

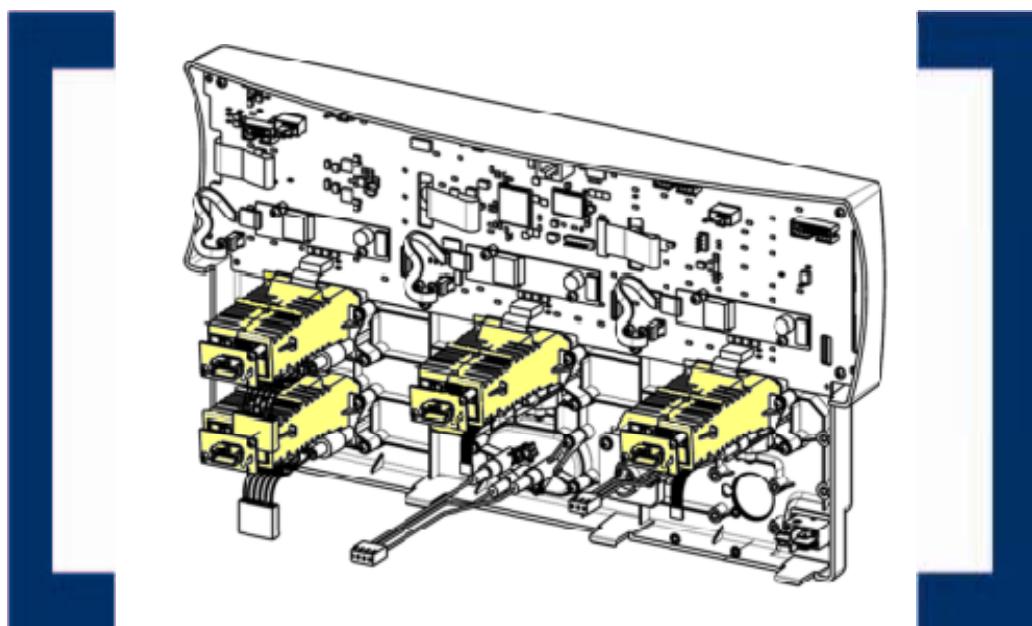
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE SCANNER CABLES

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly.
3. Carefully remove the scanner cables noting that each cable has two connectors on each end of the ribbon cable. Replace with new scanner cables.
4. Re-install the front panel assembly and replace the cover.
5. Perform a level 1 calibration as outlined in the Calibration Section.



Replacing the System Foot Switch Board

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 2 calibration.

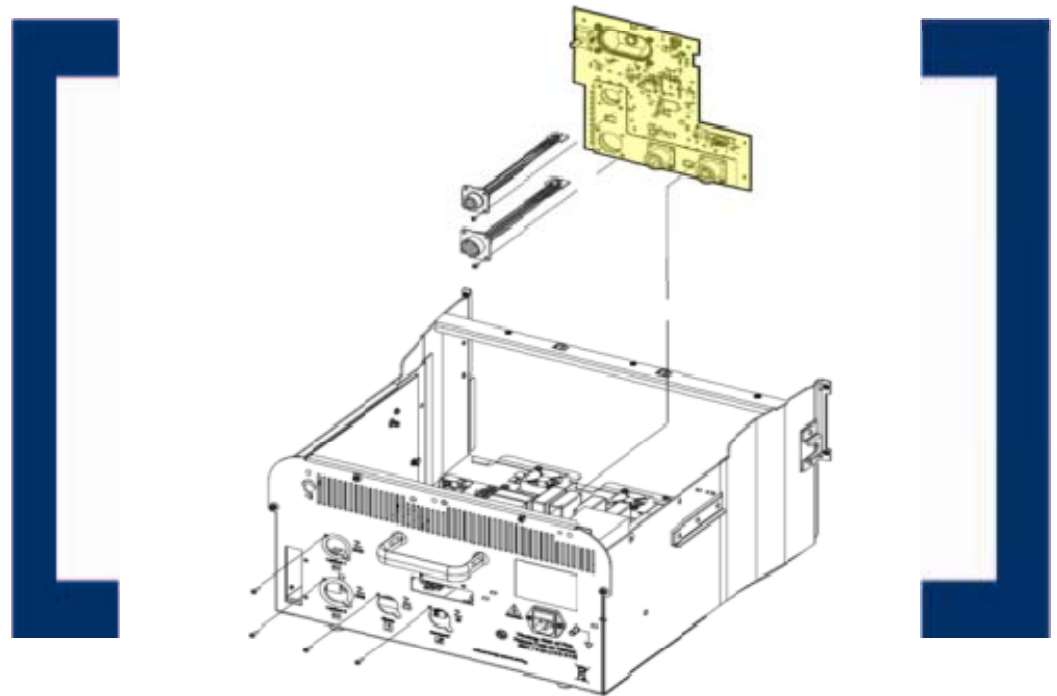
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE FOOT SWITCH BOARD

1. Remove the cover to the ForceTriad system.
2. Remove the cable assemblies from the board.
3. Remove the six mounting screw holding the board to the chassis.
4. Carefully remove the board and replace with new board.
5. Replace the six mounting screws and reconnect the cable assemblies.
6. Perform a level 2 calibration as outlined in the Calibration Section.

Replacing the System Fans

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 0 calibration.

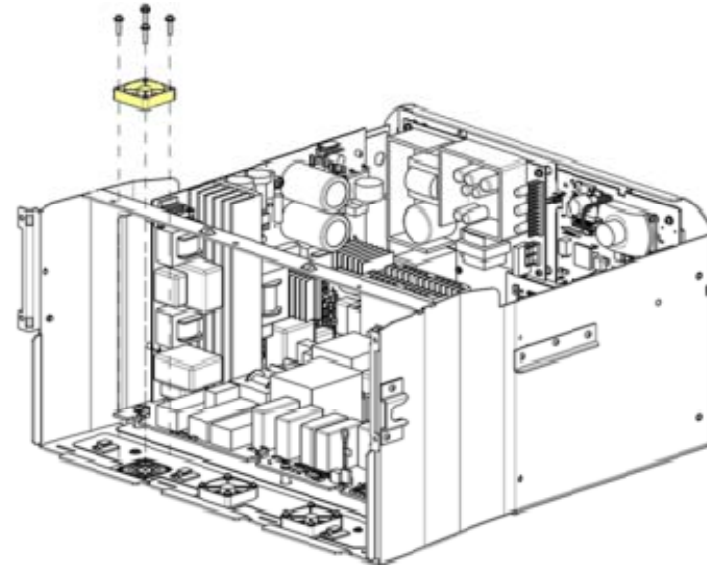
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE SYSTEM FANS

1. Remove the cover to the ForceTriad system.
2. Remove the Front Panel assembly and RF Board.
3. Remove the mounting screw holding the fan(s) to the housing.
4. Remove the fan(s) and replace with new fan(s).
5. Replace the mounting screws, re-install the RF board, and re-install the front panel assembly.
6. Perform a level 0 calibration as outlined in the Calibration Section.



Replacing the System Fuses

EQUIPMENT REQUIRED

#1 Flathead Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 0 calibration.

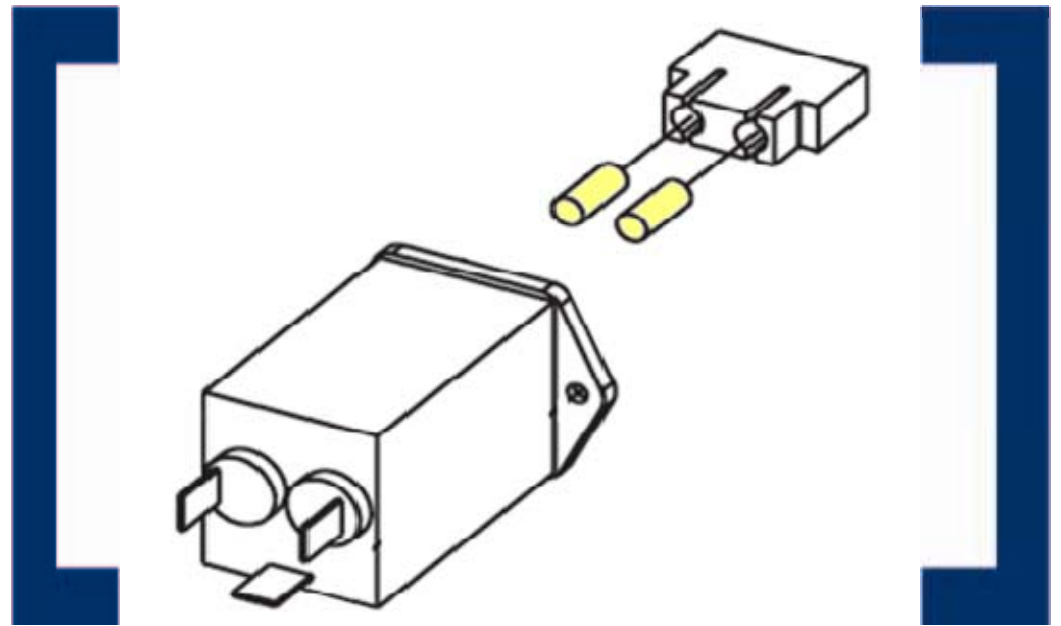
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE SYSTEM FUSES

1. Remove the fuse holder using the flathead screwdriver.
2. Remove the fuses from the holder.
3. Replace the bad fuses as needed.
4. Reinstall the fuse holder into the socket.
5. Perform a level 0 calibration as outlined in the Calibration Section.

Replacing the System Power Cable

EQUIPMENT REQUIRED

None

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 0 calibration.

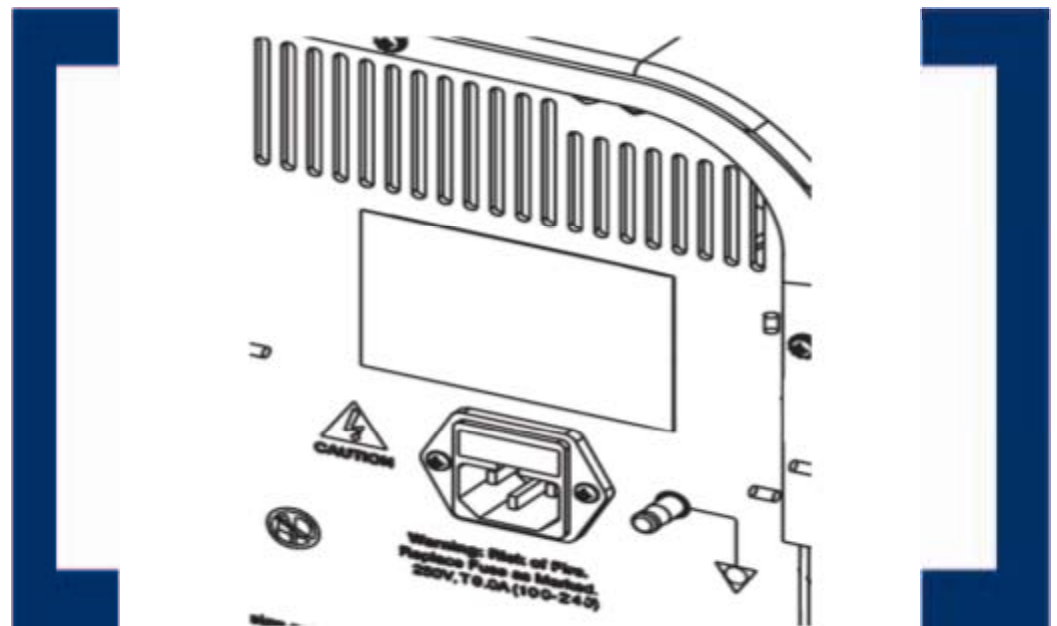
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE SYSTEM POWER CABLE

1. Remove power from the unit via the power switch in the front of the system.
2. Remove the existing power cable from the unit.
3. Replace the power cable.
4. Reinstall the power cable into the unit.
5. Perform a level 0 calibration as outlined in the Calibration Section.

Replacing the Display Inverter

EQUIPMENT REQUIRED

#2 Phillips Screwdriver

CALIBRATION REQUIREMENT

Performing the service mentioned below requires a level 3 calibration.

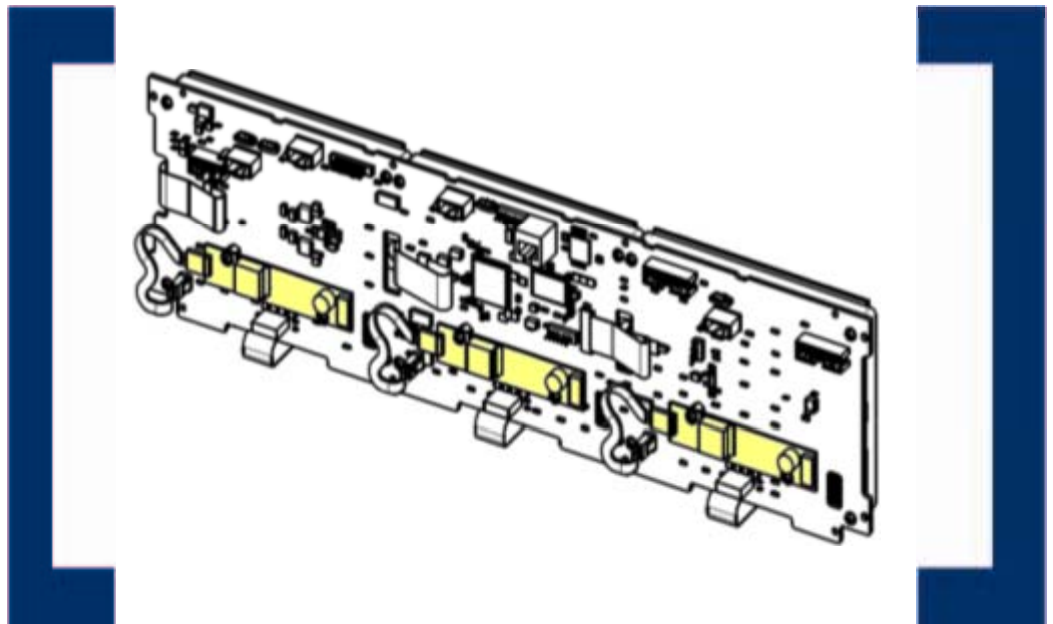
WARNING

Electric Shock Hazard

To allow stored energy to dissipate after power is disconnected; wait at least five minutes before replacing parts.

CAUTION

The generator contains electrostatic-sensitive components. When repairing the generator, work at a static-control workstation. Wear a grounding strap when handling electrostatic-sensitive components, except when working on an energized generator. Handle PCBAs by their non-conductive edges. Use an antistatic container for transport of electrostatic-sensitive components and PCBAs.



REPLACING THE DISPLAY INVERTER

1. Remove power from the unit via the power switch in the front of the system.
2. Remove the front panel assembly & Steering Relay Board.
3. Remove the two cables from the inverter board.
4. Remove the two mounting screws holding the inverter board.
5. Install the new inverter board, screws, and cables.
6. Reinstall the Steering Relay Board and front panel assembly.
7. Perform a level 3 calibration as outlined in the Calibration Section.

Periodic Safety Check

The periodic safety check is designed to inspect the ForceTriad system for proper functionality and to ensure that the safety features of the unit are intact. The following safety checks should be conducted once a year and recorded for future reference. Should the system fail to meet any of the checks and develops an error, refer the Error Code Definition & Troubleshooting section of this guide.

Safety Checks to be Performed

1. Initial Inspection
2. System Self-Check
3. Calibration (if applicable)
4. Low voltage Power Supply (if applicable)
5. Audio Test
6. REM & Autobipolar Test
7. Cross Coupling Test
8. Power Delivery at Receptacle
9. Power Output Test
10. High Frequency Leakage
11. Safety Test & Valleylab Exchange

Preventive Maintenance Check Sheet	
Unit Serial Number	Date of Maintenance
Initial Inspection	
Rear panel inspection	Accept Y or N
Front panel inspection	Accept Y or N
Footswitch inspection	Accept Y or N
Power cord inspection	Accept Y or N
Internal component inspection	Accept Y or N
System Self-Check	
System self-check	Accept Y or N
Calibration (if applicable)	
Calibration Level	Complete
Low-Voltage Power Supply (if applicable)	
+ 5 VDC	5.00 V to 5.20 V
+12 VDC	11.4 V to 13.2 V
-12 VDC	-12.36 V to -11.64 V
Audio	
Tone audible at high and low ranges	Accept Y or N

The entire Preventive Maintenance procedure and checklist can be found in the system service manual with a date code later than 06/2011.

