

# DELL FOUNDATIONS TRAINING FOR RUGGEDIZED NOTEBOOKS

Duration 90 Minutes



*You will need to close this window and re-launch the course if your session is inactive for more than two (2) hours.*



# INTRODUCTION

**This Dell Foundations course for Ruggedized notebooks** presents an overview of Dell's Ruggedized portfolio, troubleshooting guidelines, Need to Know callouts for selected systems, and information on how to perform replacement of Dell Latitude XFR & ATG parts.

This course is designed to provide collective information across all ruggedized notebook systems. For specific product information on each Dell system, refer to the course materials for the system you require.



# COURSE OBJECTIVES

AT THE END OF THE COURSE,  
YOU WILL BE ABLE TO:

- Explain the positioning of the Latitude XFR & ATGs portfolio
- Define safety and troubleshooting best practices, state commonly required tools, and list additional technical resources available
- For each of the Desktop Common and Specific **Need to Know** procedures, recall the disassembly and reassembly procedure demonstrated.



# COURSE OVERVIEW

This course is made up 6 sections - Introduction , Product Portfolio, Fundamentals, Need to Know, Summary and an Assessment to certify completion.

Introduction

Product  
Portfolio

Fundamentals

Need to Know

Summary

Assessment





# PRODUCT PORTFOLIO

This course is designed to provide collective information across all ruggedized notebook systems. For specific product information on each Dell system, refer to the course materials for the system you require.

# Ruggedized Notebooks Portfolio Positioning

**Models and configurations** change frequently in order to avail of the newest technologies and meet the needs of our customers. The information in this section should be considered a general introduction to Dell Ruggedized Notebooks.



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Latitude XFR



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Latitude ATG



# LATITUDE XFR

Fully ruggedized for shock, thermal and solid\liquid ingress protection in extreme environments

- 14" HD reinforced display
- Optional resistive touch screen
- Discrete graphics
- Hot swappable media module options
- IP-65 (Dust tight, water jet resistant)
- MIL-STD-461F (Electromagnetic Compatibility)
- UL1604 (Fire\Explosion Hazard )
- Enhanced conductive cooling thermal management system



# LATITUDE ATG

Semi-rugged to withstand harsh environments, including dust, humidity, and vibration

- 14" HD reinforced display
- Optional resistive touch screen
- Discrete graphics
- Hot swappable media module options
- MIL-STD-810G (Environmental limits – temperature, pressure, humidity, shock, vibration )
- IEC60529 IP5X (Dust protected) with Spill-resistant keyboard and Port covers



# Portfolio Knowledge Check

Question 1 of 1

Point Value: 10

Using the support.dell.com material, please answer the following question.  
(Note: please do not close the course while researching this question.)

The Latitude E6420 ATG features port covers. How many screws must be removed when removing the right port cover?

- 7
- 5
- 3
- 1
- none



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# FUNDAMENTALS

This course is designed to provide collective information across all ruggedized notebook systems. For specific product information on each Dell system, refer to the course material for the system you require.

# OBJECTIVES

This section presents fundamental knowledge required prior to troubleshooting Dell Ruggedized Notebooks. More detailed information can be found on [dell.com](http://dell.com).

**At the end of the module, you will be able to:**

- ✓ Define general safety procedures
- ✓ Utilize Ruggedized Notebook repair best practices
- ✓ Confirm your Service Tag
- ✓ List available diagnostic tools and indicators
- ✓ State troubleshooting guidelines
- ✓ State commonly required tools
- ✓ List additional technical resources available



# CATEGORIES

General Safety  
Precautions

Best Practices

Diagnostics and  
Indicators

Troubleshooting

Recommended  
Tools

Technical  
Resources

# General Safety Precautions



# GENERAL SAFETY PRECAUTIONS



- 1** Turn off the system and any attached peripherals.
- 2** Disconnect the system and any attached peripherals from AC power, and remove the battery.
- 3** Disconnect network or telephone lines from the system.
- 4** Use a wrist grounding strap and mat when working inside any computer system.
- 5** After removing any system component, carefully place the removed component on an anti-static mat.
- 6** Wear shoes with non-conductive rubber soles.

# ELECTROSTATIC DISCHARGE (ESD)

ESD is a major concern when handling components. Very slight charges can damage circuits. ESD damage may occur immediately or it may result in intermittent problems or a shortened product lifespan.



Use only a properly grounded ESD wrist strap. Wireless anti-static straps are inadequate. ESD mat should be properly grounded. If work surface is not grounded, connect to a metal surface, such as table or desk .



Simply touching the chassis before handling parts is not adequate protection.



Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor and workbench pads.



Handle static-sensitive components by the edges. Avoid touching pins and circuit boards.



When unpacking a static-sensitive component, do not remove it from the anti-static package until ready for installation. Before opening the anti-static package, discharge static electricity.



Before transporting a static-sensitive component, place it in an anti-static container or package.

# PREVENTING ELECTROSTATIC DAMAGE

This demonstration will show:



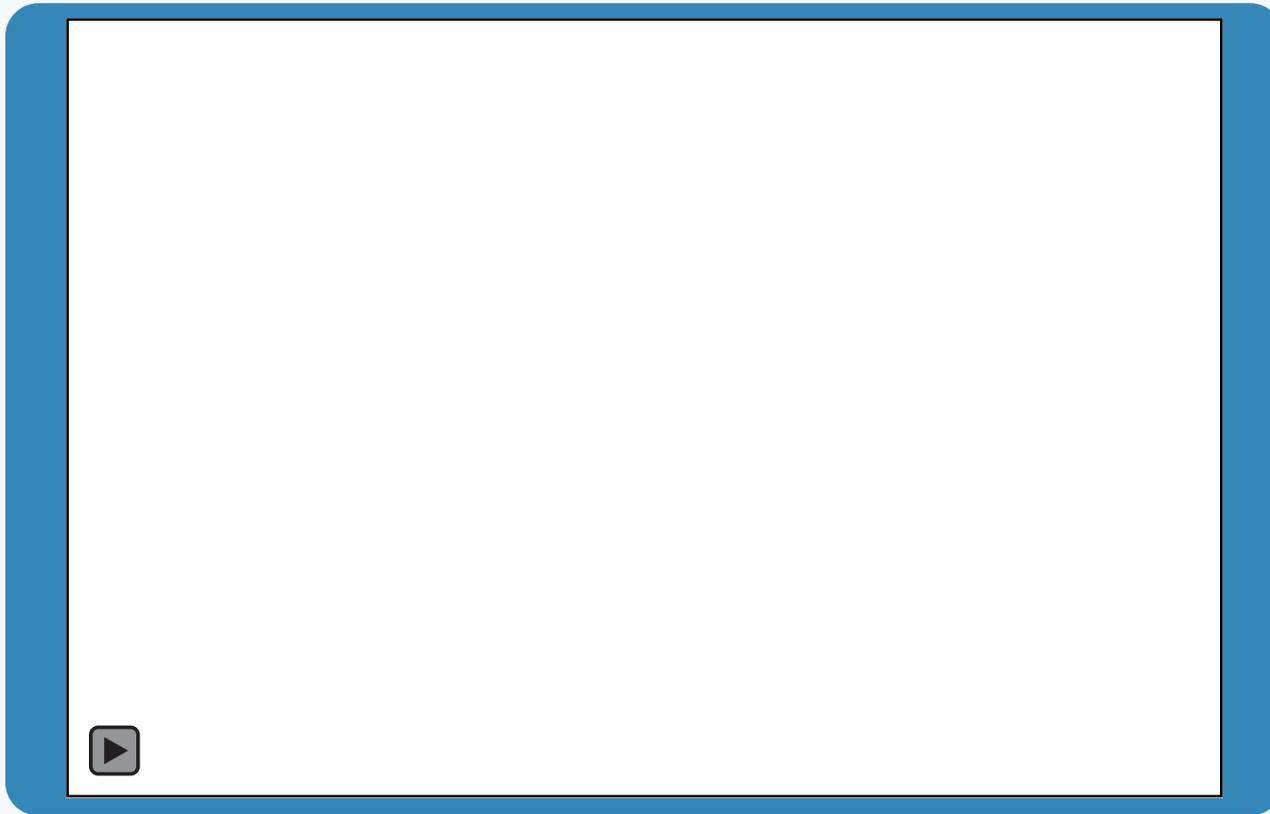
How static electricity destroys equipment.



How to prevent electrostatic damage.



How to transport static-sensitive items.



# ESD Knowledge Check

Question 1 of 1

Point Value: 10

The best method of avoiding Electrostatic Discharge is to:

- Use a grounded ESD wrist strap
- Use anti-static floor and workbench pads
- Use a magnetized screwdriver
- Touch a non-painted part of the chassis



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# BEST PRACTICES



# General Guidelines



**It is vital to verify the fix.**  
Take extra care to ensure that the problem is solved after troubleshooting and that no other problem exists.

Start the troubleshooting process before opening a part's sealed packaging.

If you have received more than one part, verify the failed component prior to opening a part's packaging.

Many issues can be addressed with the latest version of BIOS. Whenever possible, always download and install the latest BIOS revision prior to troubleshooting.

**NOTE:** Troubleshooting prior to parts replacement is not always an option. Always follow process and dispatch instructions.

# CONFIRM YOUR SERVICE TAG

Always check the service tag to ensure you are servicing the correct system.



# Repackaging

Parts that are returned to Dell should be repackaged in the same manner in which they were received. Electro-static bags, socket covers, and LCD protective materials such as Mylar screen covers are examples highlighted below. Also, some system boards are shipped with Daughter boards attached. Technicians are required to return the fully assembled system board with daughterboard to avoid transit damage back to Dell. Below is an example a common repackaging issue:



Every dispatched system board has a ZIF socket T cover installed to protect the pins on the system board when shipped for repair. All field technicians must return the defective system board with the cover properly attached to the Socket T on the service board to prevent the pins from being damaged during transportation.

# Repackaging – Parts Unpacking

All parts including motherboards, cards, HDD, etc. must be handled by lifting and holding from the edges or sides. Avoid touching the surface or bottom of the parts.



Do not break the tamper proof seal on the ESD bag unless you intend to install the part immediately.

Verify the part. If you have questions contact technical support.

Place the box on a secure surface and break the tamper proof seal with a safe tool. Carefully open the package top or lid.

Visually inspect the foam and the part was packaged correctly. Remove upper layer of foam from the box.

If the part contained in the box was secured properly without visible damage, continue with next steps.

Using approved ESD procedures, carefully remove the part from the box by lifting the part from the edge or side. If needed, place the part on a secure ESD surface. Never stack parts on top of each other.

If the part has visible damage, do not use the part. Contact tech support to dispatch another part. Return the part with a description of the damage.

# Repackaging – LCD Module

Parts that are returned to Dell should be repackaged in the same manner in which they were received.



Insert unit into new ESD bag. Fold the ESD bag to the front and place the first PPID\* (Piece Part ID) Package label on the ESD bag. Ensure the label position is placed evenly on the three surfaces of the ESD bag.



For repackaging, use the same box the part arrived with foam inserts. Ensure the box has the bottom packaging foam and the side packaging foam inserts.



Place the LCD unit into box enclosed with the foam packing. Fold the excess portion of the ESD bag to the back and place the panel in the box facing down.



Apply the final foam insert on top of the unit. Close the box top and insert the lid tabs into the slots on the left and right edge. Complete the traveller (sticker) if required.

Place extra parts between the upper covering foam insert and the box lid. Only small service kit part such as cables, inverter, converts are allowed, use plastic bag if available.

Where an LCD clamshell is available, the LCD must be oriented with the panel face up and the top of panel on the hinge side of clamshell.

\* Every Dell part has a unique PPID with barcode

# LCD Handling



When handling LCDs:



Always handle LCD from side/edge with both hands.



Never lift or handle LCD with a single hand. Never handle the LCD from top or bottom.



Never apply pressure to the backside of the LCD. Never place objects on the surface of the LCD.

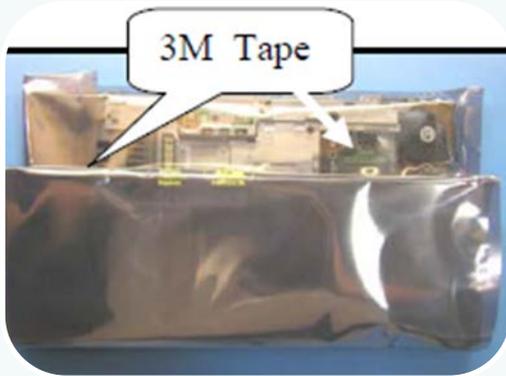
# Repackaging – Printed Circuit Board Assembly (PCBA)

Parts that are returned to Dell should be repackaged in the same manner in which they were received.



Carefully insert board into ESD bag ensuring components are not pulled or knocked off.

Fold the top part of the ESD bag and re-tape.



Pack the board into the foam inserts of a Dell approved box, with the bottom of the board down and the surface of the board facing up. The PPID sticker should be placed on top.

Place covering foam over the unit. Close the box top and insert the lid tabs into the slots on the left and right edge.



Place small extra parts between the upper covering foam insert and the box lid.

Hold and carry motherboards using both hands.

PCBA's are very susceptible to handling damage. Ensure ESD methods are applied when handling PCBA's.

# System Motherboard Replacement – Service Tag Utility

## Entering Service Tag:

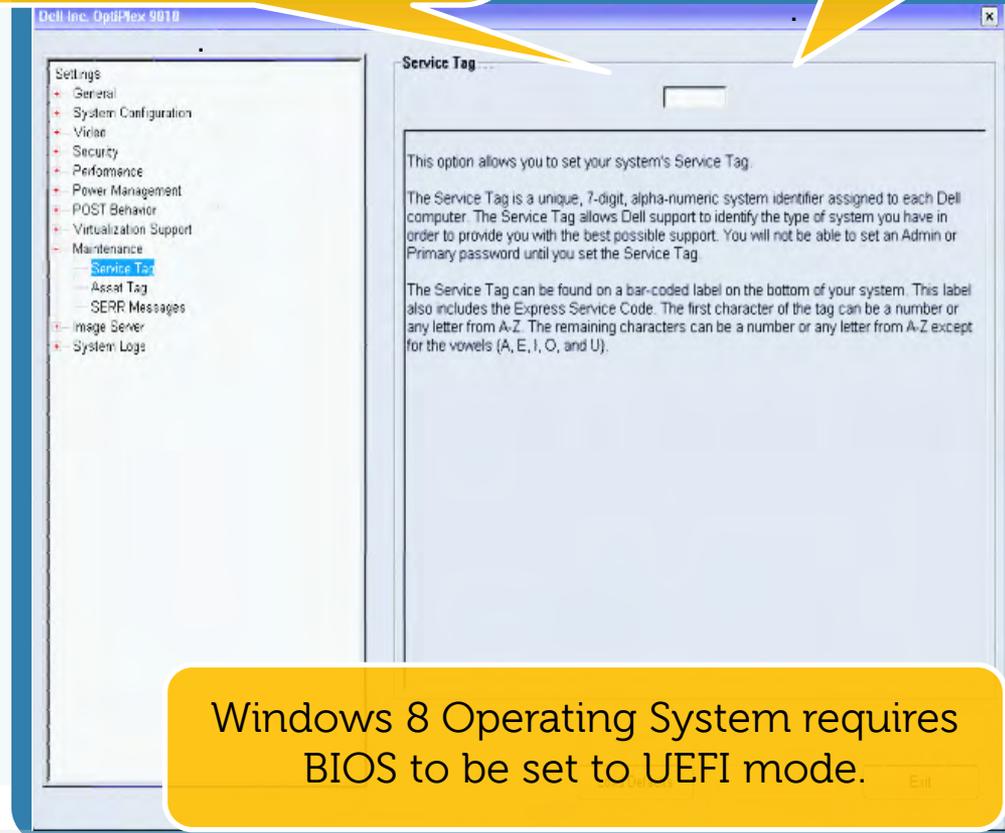
Press F2 after power-on to enter BIOS (boots directly into BIOS Service Tag field in some models)

Navigate to Maintenance field, then enter *Service Tag*, and confirm

If Maintenance field is not present, navigate to System Info, then Security Info field to enter *Service Tag*

Always reset the Service Tag after a system board replacement. Ensure that you enter the Service Tag information correctly.

Replacement Motherboards allow the Service Tag to be entered without a BIOS CD\*



Windows 8 Operating System requires BIOS to be set to UEFI mode.

\* Older products may be supplied with a BIOS CD. If supplied, the BIOS CD should be used.

# System Board Knowledge Check

Question 1 of 1

Point Value: 10

When returning a damaged system board to Dell, which of the following two items should be used to prevent damage during transportation:

- ZIF socket T cover
- Solid plastic case
- Mylar cover
- Electro-static bag



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# Diagnostics and Indicators



# DIAGNOSTICS AND INDICATORS



Diagnostic Indicators

POST

BIOS

ePSA (enhanced Pre-Boot System Assessment)

PAID (Platform Advanced Integrated Diagnostic)

Dell Support Center:

PC Checkup by PC Doctor

System Information

# Diagnostic Indicators

Below is a sample of diagnostic indicators but always refer to the Product Documentation for a comprehensive list of LED Codes for specific Ruggedized product lines.

HDD/Storage LED	Battery LED	Wireless LED	Fault Description
Blinking	Solid	Solid	A possible processor failure has occurred.
Solid	Blinking	Solid	The memory modules are detected but has encountered an error.
Blinking	Blinking	Blinking	A system board failure has occurred.
Blinking	Blinking	Solid	A possible graphics card/video failure has occurred.
Blinking	Blinking	Off	System failed on hard drive initialization OR System failed in Option ROM initialization.
Blinking	Off	Blinking	The USB controller encountered a problem during initialization.
Solid	Blinking	Blinking	No memory modules are installed/detected.
Blinking	Solid	Blinking	The LCD encountered a problem during initialization.
Off	Blinking	Blinking	The modem is preventing the system from completing POST.
Off	Blinking	Off	Memory failed to initialize or memory is unsupported.

# Power On Self-Test (POST) Codes



During POST, the system uses LEDs to display error codes.

The LEDs used to display POST codes and the codes themselves can differ for each system.

Always check system-specific documentation.

**NOTE:** Beep codes can also be used as a diagnostic tool. Information on beep codes can be found on the [support.dell.com](https://support.dell.com) site.

# LED Code Knowledge Check

Question 1 of 1

Point Value: 10

Because the LEDs used to display POST codes and the codes themselves can differ for each system, it is important to know where to find POST code information. Using the support.dell.com resources, match the LED status with the correct error.

For this activity, assume you are working with a Latitude ATG.

HDD LED: Solid  
Battery LED: Blinking  
Wireless LED: Solid

-- Select --

HDD LED: Blinking  
Battery LED: Blinking  
Wireless LED: Blinking

-- Select --

HDD LED: Blinking  
Battery LED: Solid  
Wireless LED: Blinking

-- Select --

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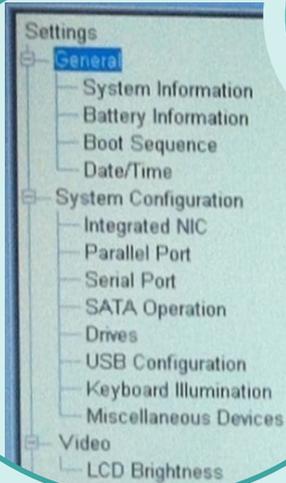


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# BIOS Details



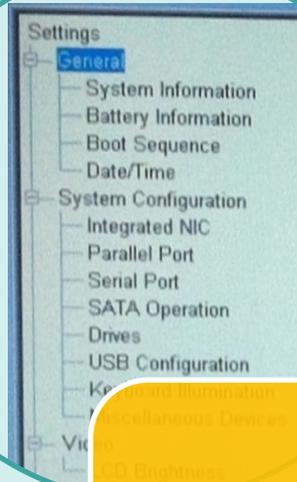
## What?

Basic Input/Output System

Activates all hardware required to boot including:

- Chipsets
- Processors and Caches
- System Memory
- Internal Drives
- Graphics and Audio Controllers
- Internal Expansion Cards

# Why Use BIOS?



Some of the reasons you may need to go into the BIOS.

## Why?

Verify devices are connected.

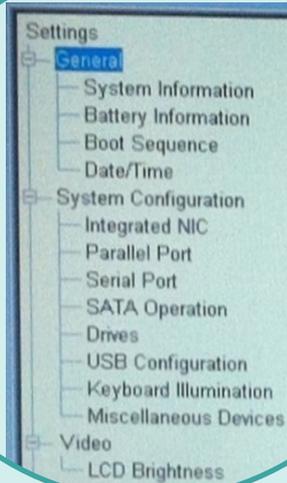
Report on the computer hardware including:

- Hard Drive Size
- Amount of Memory
- Current Processor Information

Make adjustments to hardware functionality:

- Hardware configuration
- Date and Time
- Boot Sequence
- System and Hard Drive Passwords
- Restore Default Configuration

# BIOS



## How?



Restart your computer.

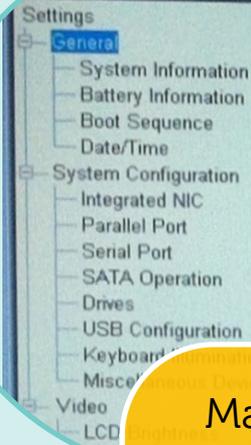


At the first text on the screen or when the Dell™ logo appears, tap <F2> until the message **Entering Setup** appears.



Alternatively, press <F12> then select **BIOS Setup** from the Boot Options menu

# How to Use BIOS



Making changes in the BIOS or updating the BIOS can lead to system instability and data loss. Proceed with caution. It is recommended that the customer backs up the hard drive before any BIOS changes are made.

## How?

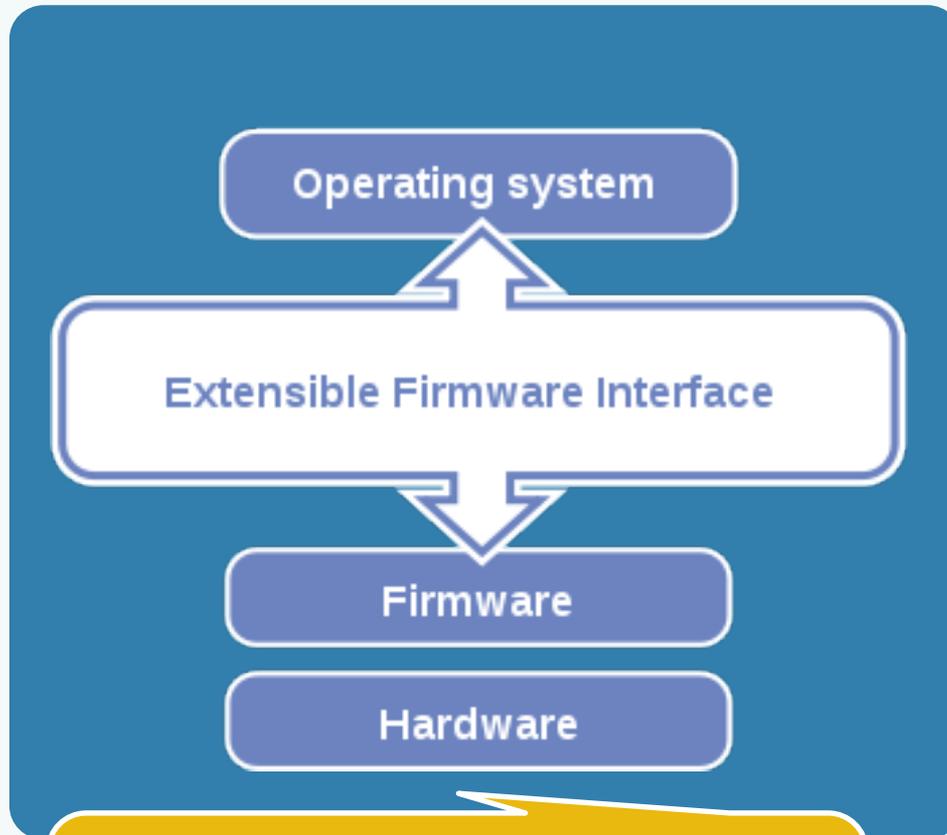
Restart your computer.

At the first text on the screen or when the Dell™ logo appears, tap <F2> until the message **Entering Setup** appears

Alternatively, press <F12> then select **BIOS Setup** from the Boot Options menu

# UEFI BIOS

The UEFI (Unified Extensible Firmware Interface) specification defines a new model for the interface between PC OS and platform firmware



Dell UEFI BIOS implementation supersedes the older BIOS in the portables and desktop products into one single UEFI BIOS

UEFI BIOS is responsible for booting an OS as well as running pre-boot applications, such as ePSA

There is no difference in the boot sequence unless the UEFI option is checked in the 'Boot Sequence' setting in the BIOS page

Windows 8 operating systems requires BIOS to be set to UEFI mode.

# BIOS Knowledge Check

Question 1 of 1

Point Value: 10

Which three of the following are reasons to enter the BIOS?

- Report on computer hardware
- Verify devices are connected
- Verify operating system functionality
- Make adjustments to hardware functionality



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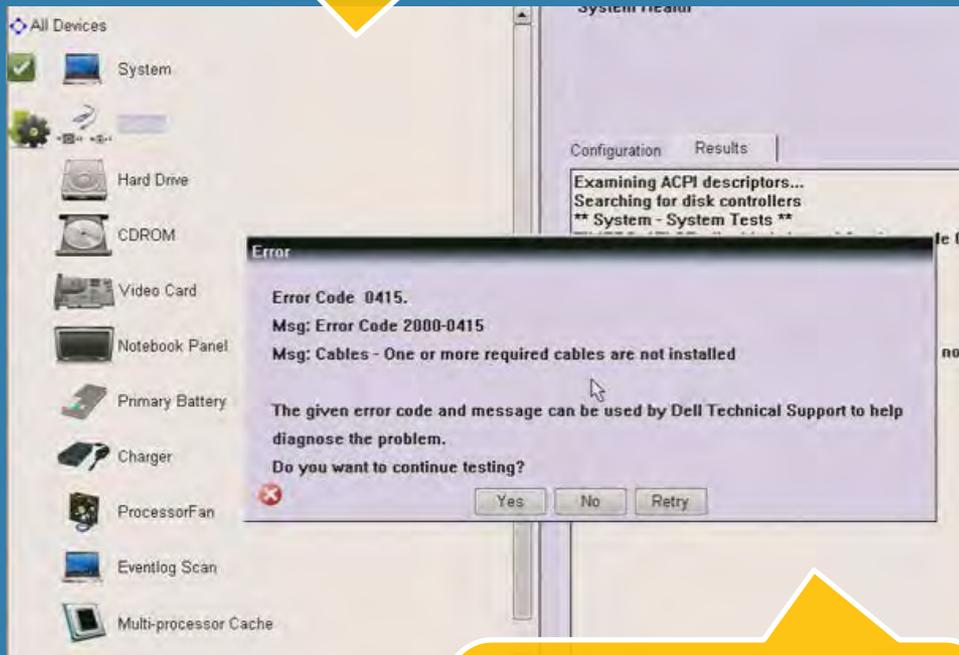
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# Enhanced Preboot System Assessment (ePSA)

The ePSA help screen can be accessed pressing <F12> during POST, and then selecting Diagnostics

ePSA has replaced Dell 32-bit Diagnostics

The Preboot Assessment tool can be accessed from the BIOS or run from external media.



ePSA provides advanced diagnostics on a range of devices including:

- Power Supply
- Battery
- Processor
- Memory
- Drives
- Thermals
- Display
- Other Components

Run ePSA after the fix to verify repairs.

# ePSA Download Files

ePSA began shipping on new products, in March 2011, and is embedded in BIOS. For older products, a version of ePSA can be used from a bootable USB key. Please refer to the Quick Links in Dell's learning management system for instructions and download files for the USB key version.

# ePSA Comparison with PSA



# ePSA Knowledge Check

Question 1 of 1

Point Value: 10

Select three devices which ePSA can perform advanced diagnostics on

- Thermals
- Display
- Serial
- Drives



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# Platform Advanced Integrated Diagnostics (PAID)



The Platform Advanced Integrated Diagnostics (PAID) improve the test capabilities and features for better problem detection on Dell portable platforms.

Once the PAID diagnostics complete, the Enhanced Preboot System Assessment (ePSA) diagnostics execute. If any PAID diagnostic error codes exist, they are reported with the PSA diagnostic error codes.

# Checking if Paid is Available

PAID is not available on all systems. To see if PAID is available try these steps:



## HOW DO I START THE PAID DIAGNOSTICS?

1. Press and hold down the <Fn> key, then press the power button.

## KEYBOARD OR POWER BUTTON NOT RESPONSIVE

1. Remove the battery.
2. Press and hold down the power button.
3. Insert the AC adapter.

## POWER BUTTON BOARD NOT DETECTED

1. Remove the battery.
2. Insert the AC adapter.

## To run the PAID LCD BIST diagnostic

1. Verify the system is turned off.
2. Press and hold down the <D> key.
3. Press the power button.

# Dell Support Center



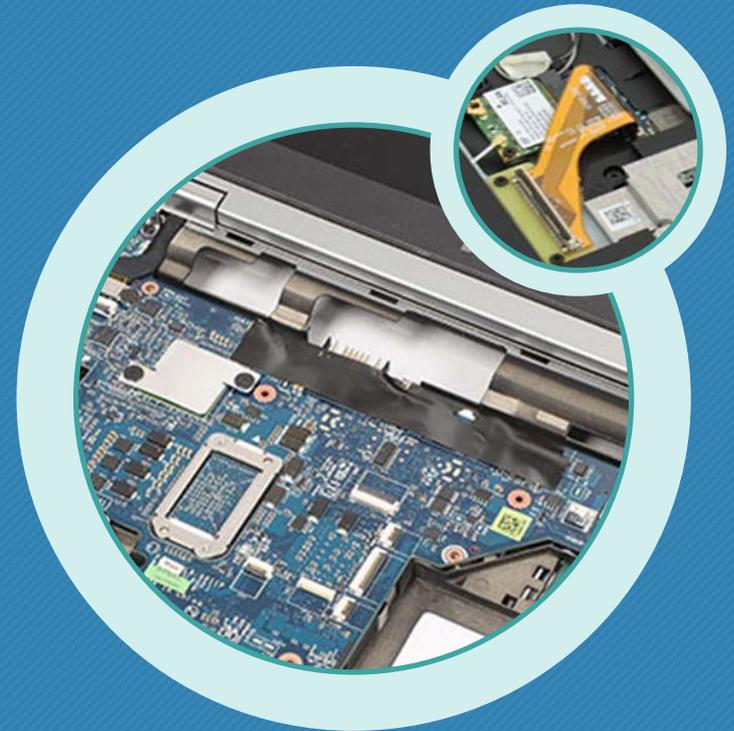
Download Dell Support Center from the Dell PC Diagnostics page at [support.dell.com](http://support.dell.com)

Dell Support Center offers additional information, such as:

- System Alerts
- Backup & Recovery
- Training & Tutorials
- Drivers and Downloads
- PC Checkup

# Troubleshooting

The purpose of this section is not for detailed troubleshooting. Instead, it is focused on best practices to prevent the replacement of good parts, improve customer satisfaction, and to eliminate repeat dispatches. This information is not meant to override or limit local practices.



# Processors



Processors rarely fail.

Processor troubleshooting steps can be found on the following slide.

# Processor Troubleshooting Steps

## Eliminate thermal checks

- Check BIOS or OS event logs
- Ensure fans are operational
- Ensure thermal material is in place
- Ensure heat sinks are not obstructed

## Check beep codes

- Checking a beep code involves inducing an error condition such as removing all of the memory
- If the system beeps, the processor is performing basic functions and is likely not the source of the problem

If the source of the problem is unclear but is either the processor or the system board, replace the system board first.

# Memory



Do not open the DIMM packaging before confirming a bad module.

Like processors, a very high percentage of memory modules received after repair have no defects.

All the memory in a system is unlikely to fail at the same time.

# Memory Troubleshooting Steps

Reseat the memory modules (DIMM), and recheck for a memory error.

If there is more than 1 DIMM, remove all but the memory in the

If the error remains, swap out the other DIMM into the same slot

If the error remains, it's likely a system board (DIMM connector)

If the error is gone, then the first module was bad

For memory troubleshooting steps refer to next page

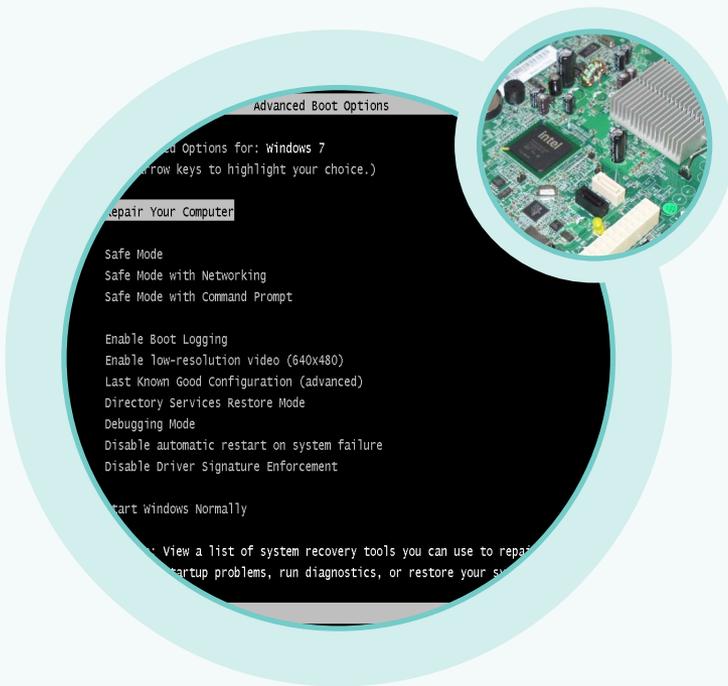
If bad memory is confirmed, replace only the confirmed bad DIMM, unless specified on Dell's dispatch notes.

# Boot Issues-Considerations

## BEFORE REPLACING A HARD DRIVE

Run the hard drive self-test

- Run from ePSA.
- Running the hard drive self-test is 90% effective and takes less than 7 minutes no matter what size hard drive is being tested.



# Boot Issues- Troubleshooting Steps

1

Power on system and press <F2> for BIOS.

2

Arrow down to hard drive field.

3

If HDD is not detected, shut down machine and reseal connector.

4

If HDD is detected, power off and run ePSA, shown, steps A through E.

a

Power on the system.

b

At the Dell splash screen press <F12> until the one-time boot menu appears. The user will be provided a menu.

c

Arrow down to "Diagnostics" and press <Enter>. PSA Diagnostics is now launched.

d

At about 1 minute, 15 seconds from power up the user will hear a beep and be asked if colors are displayed properly. Press <Y> for yes and to continue.

e

A HD test and memory test will start and run in parallel. When the memory quick test finishes the HD self test results are displayed.

5

If ePSA says that the hard drive passes and the system will not boot, a likely problem is a corrupt or missing operating system.



[www.dell.com](http://www.dell.com)

# PSA Knowledge Check

Question 1 of 1

Point Value: 10

If PSA displays that the Hard drive passes the diagnostic test, but does not boot, what is the likely cause?

- Corrupt Operating System
- BIOS is out-of-date
- Display adapter issue
- Device Driver error



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# Overheating/Shutdowns-Considerations



Overheating and intermittent shut down may be caused when debris or dust clog the fan exhaust port.

Clean the clogged parts by blowing air directly into the fan exhaust port (either by blowing with mouth or using canned compressed air).

The air must be sent directly into the heat sink port. This is always on the sides or back of the machine.

Limit duration of the compressed air (short 2-3 second intervals) to avoid excessive spooling (RPM) of the fan.

If you cannot get compressed air into the exhaust port, place a vacuum hose on the intake port to extract the debris from the bottom of the system.

# Power Supply Units (PSUs)

If reseating the connection does not fix the issue, try resetting the power supply

- Unplug it from the wall outlet and from the system.
- Allow it to sit for about 2 minutes so it will reset.
- Reconnect it to the system.
- Amber-May be faulty, but further troubleshooting required.

If the power supply tests good

- ISOLATE the power supply by removing internal connectors, power connectors, or the cable harness.
- Continue troubleshooting by reconnecting devices one at a time to identify the failed component (hard drive, optical disk drive, PCI cards, etc.).



# System Board- Troubleshooting Steps



One quick way to verify a bad system board is to remove the DIMMS. If 4 beeps are not heard during power on, the system board is bad.

Use the indicators below, and the product documentation to determine system board faults:



Diagnostic LEDs



Power Button LEDs

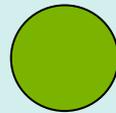


Beep Codes

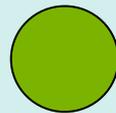
# Display-Considerations

Display problems should be isolated to the LCD or the video adapter.

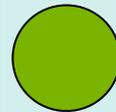
Symptoms of LCD or video adapter failure include:



Caps lock, num lock, and scroll lock LEDs respond to their respective keys even though the LCD remains blank.



Windows start-up sounds play, but the LCD remains blank.



The display is jittery, distorted, or flickers and powering up or down.

If the display is working but is displaying distorted lines, software-related problems can be eliminated by running in safe mode. In safe mode, software-related problems will disappear.

# LCD-Steps

Most Ruggedized Notebooks have an LCD BIST which runs independently of the video controller which can be run through:

 ePSA Diagnostics

 Standalone LCD BIST

If the display is working but is displaying distorted lines, software-related problems can be eliminated by running in safe mode. In safe mode, software-related problems will disappear.

Using an external monitor is not adequate troubleshooting; however, the use of an external monitor can help isolate a display problem.

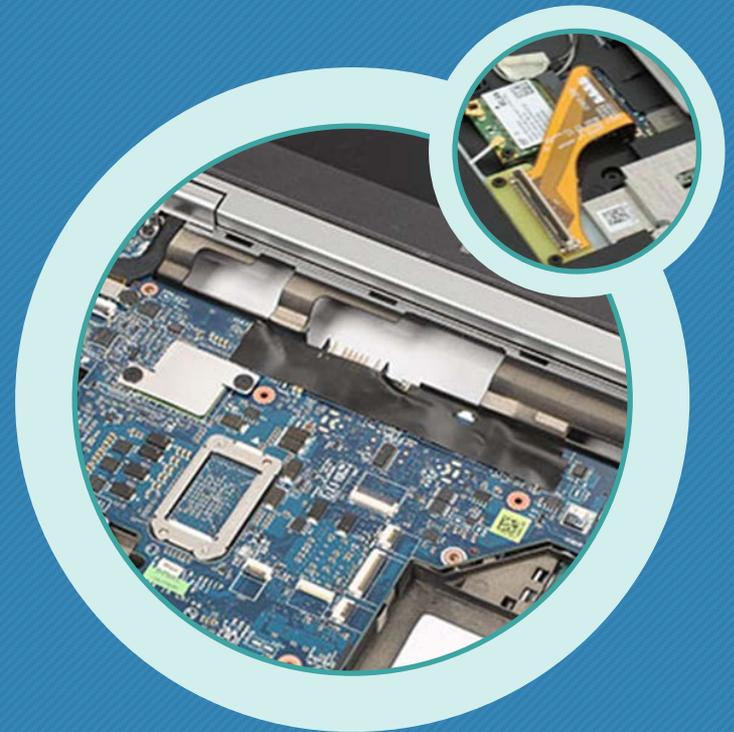
 If the problem resolves on the external display, it is likely the video adapter.

 If the problem persists on the external display, it is likely the LCD.

# Recommended Tools

Dell provides a recommended list of tools for field technicians. The tools included in this list are standard industry repair technician tools, and will likely be needed during field service for Dell products. Please review this List, which is a current list as of January 1, 2013, and use it as a guideline going forward.

**\*\*\*Important-** You can always find the most current Recommended Toolkit located in the Quick Links in Dell's learning management system.



# Recommended Tool List

Tool	Comments
#0, #1, #2 (8") Cross-tip (Phillips) Screwdriver	90% of screws covered by these two screwdrivers. Do not use metal screwdrivers on plastics
1/4" Slotted-tip Screwdriver 6"	Variety of sizes is preferred 1/8" – 3/16"
Hex Drivers	3mm, 5.5mm slim line, 7mm driver, and 7mm slim line
Torx Driver	Need T5, T8, T10,T15, T20, T25, T8 short right angle, and T8 long right angle
Anti-Static Mat and Wrist Strap	Prevents electrostatic damage
Linux Live bootable CD	Allows boot to an alternate OS environment ***ESF 1 and 2 only
USB key 4GB	EPISA or OMSA live with 32 bit diags
Plastic Scribe	Used to loosen plastic/rubber parts, Dell P/N 2N558
Flashlight	For visibility
Portable	***EMC LVL 2 ESF only

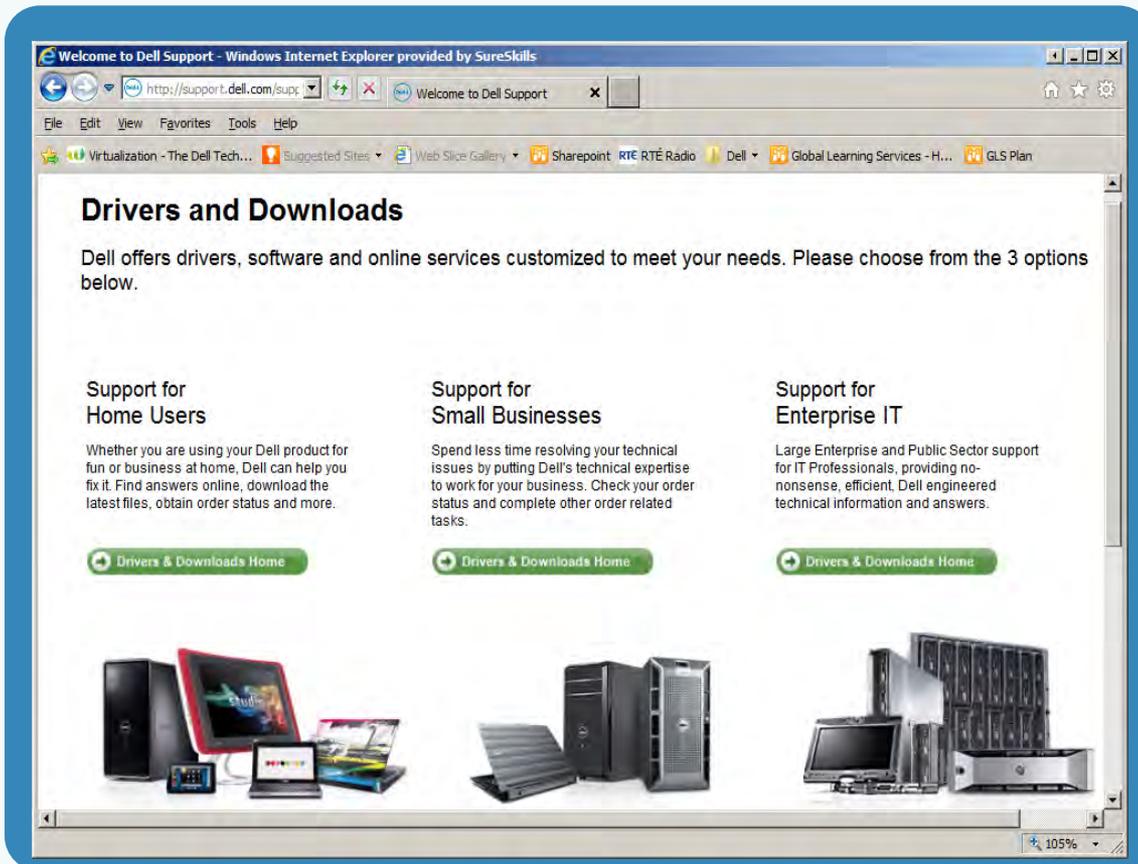
## Other Recommended Tools

Also Recommended	Comments
7/16 inch open ended wrench	Seldom used but common size, if needed
11/32 inch open ended wrench	Seldom used, if needed
5.5 mm open-end wrench	For paper alignment adjustment in hi-end lasers
Socket set	With common sizes such as 5mm and 7mm.
Magnetizer/Demagnetizer	To magnetize screwdrivers
Dell Consumables Kit	Only available in the ABU through DSP PMO Offices
USB Key 4GB	Strongly recommended for all techs
Small container for spare screws	For example, pill container
Long nosed, Needle-nose and diagonal pliers	For use in tight places
Hemostats	For handling e-clips, cir-clips and roll-pins in tight places
Wire cutters	For cutting tie-wraps or wire
Precision Screwdriver Kit	Small size convenient on portables
4" Adjustable Wrench	Useful for small square and hex nuts
8" tie-wraps	As required
Laser compatible vacuum cleaner(*)	Must have filtration system qualified to handle toner particulates ***Printers Only
Parts retrieval tool	Spring loaded, flexible shaft preferred; used to retrieve a screw or other parts
Wipes and Large Ziplock bags	***Printers Only
Masking tape and rubber bands	***Printers Only

# Technical Resources



# Drivers and Downloads



## Reasons for updating device drivers and firmware:

- Increased system performance
- Patch security risks
- Expand compatibility
- Additional features
- Bug fixes
- As directed by a Dell Support

# Service Alerts Knowledge Check

Question 1 of 1

Point Value: 10

Support Center Service Alerts report on which 3 of the following?

- Hardware
- Drivers
- Software
- File Integrity



## PROPERTIES

On passing, 'Finish' button:

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Allow user to leave quiz:

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**At any time**

**At any time**

**Unlimited times**



Properties...



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## Need to Know

This course is designed to provide collective information across all ruggedized notebook systems. For specific product information on each Dell system, refer to the course material for the system you require.

# Need to Know Objectives

The following section details procedures for:

- Ruggedized Need to Know



By the end of the section, Students should know:

- The disassembly/reassembly procedures demonstrated
- Specific callouts for each Need to Know, where highlighted

# Need to Know Overview

## SPECIFIC NEED TO KNOW CALLOUTS:

1. Card Disassembly
2. Bottom Access Panel Disassembly
3. Battery Door Disassembly
4. Hard Drive Disassembly
5. Keyboard Disassembly
6. Display Assembly Disassembly
7. Palmrest Disassembly
8. USB Board and Cable Disassembly
9. Handle Disassembly
10. System Board Disassembly
11. LCD Bezel Disassembly
12. LCD Panel and Dampeners



# Card Disassembly

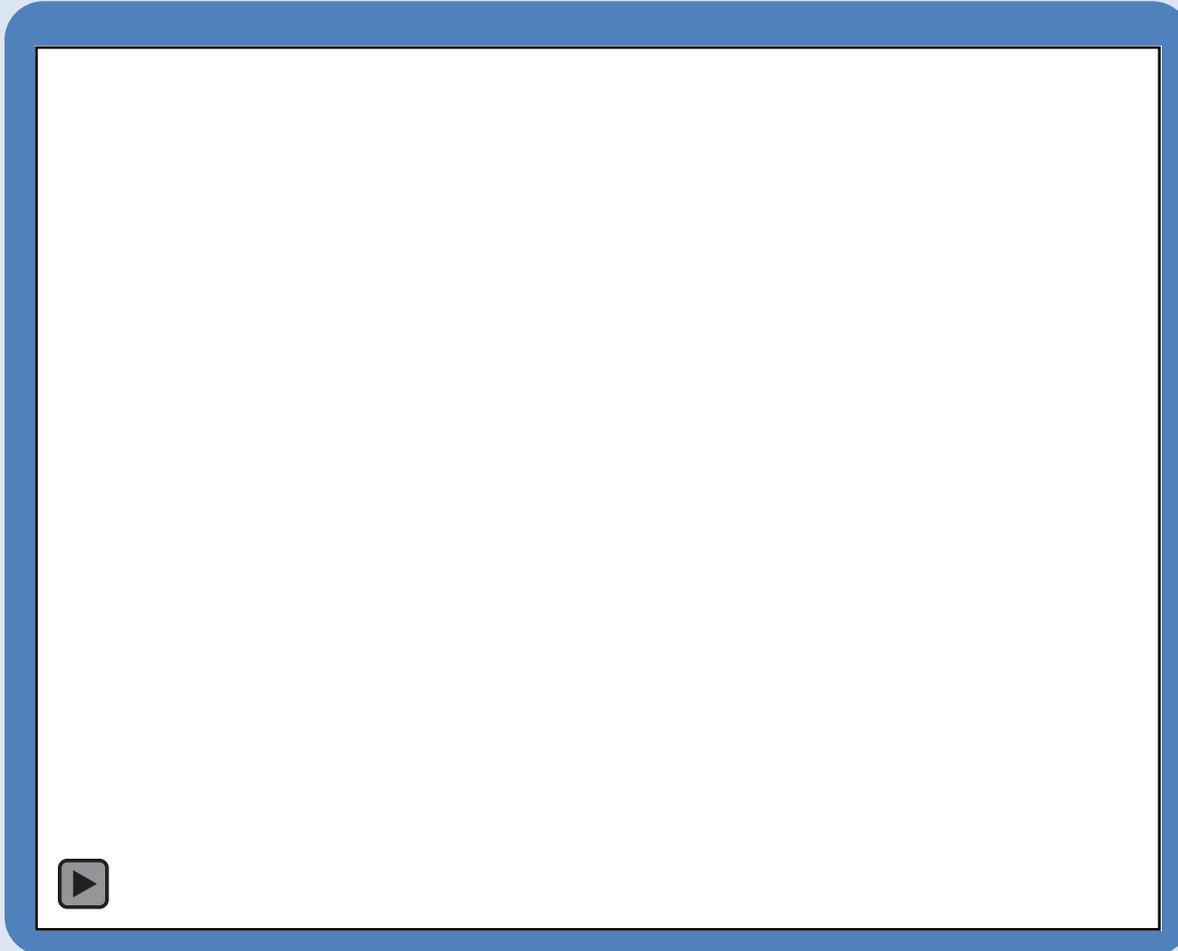


1. Remove one screw from the I/O card.

2. Remove the four standoff screws holding the VGA/Serial cover on.

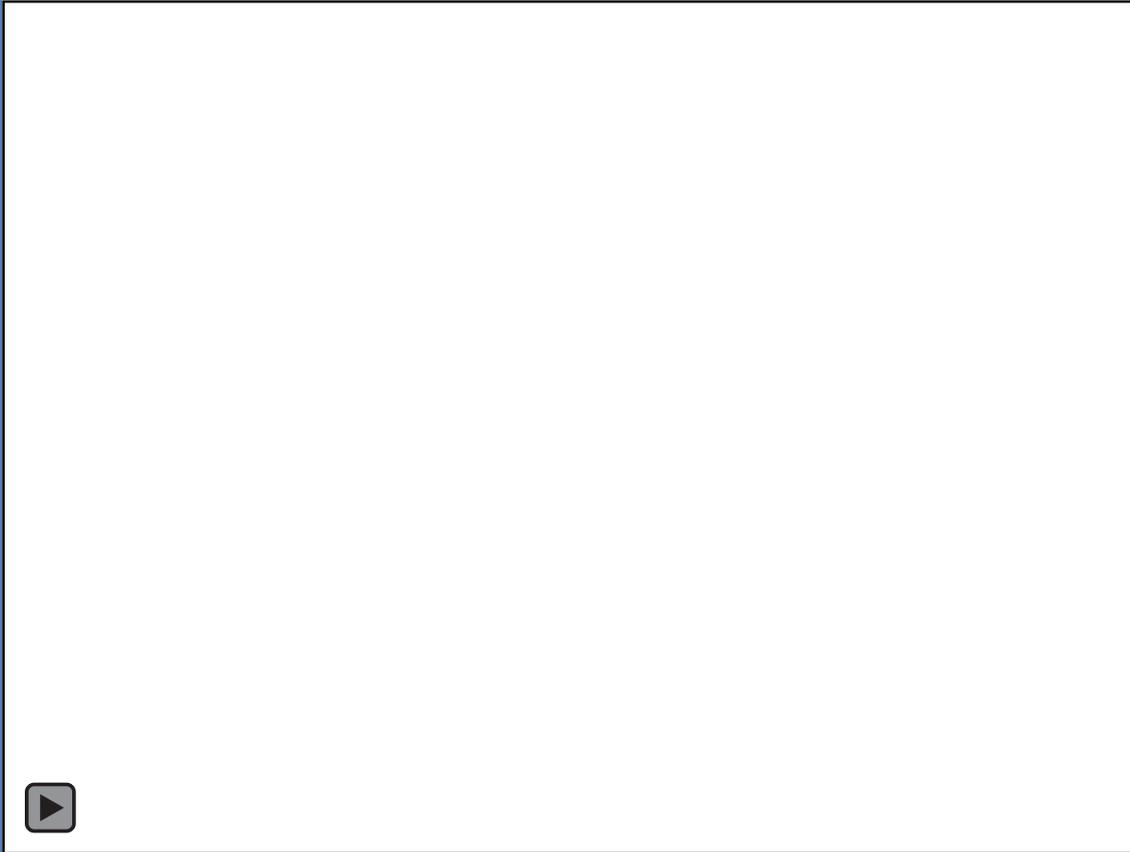
3. Lift the I/O board out from the system.

# Bottom Access Panel Disassembly



1. Remove the twenty-three screws that secure the bottom access panel.
2. Loosen the single captive screw.
3. Lift the bottom access panel to remove it from the base assembly.

# Battery Door Disassembly



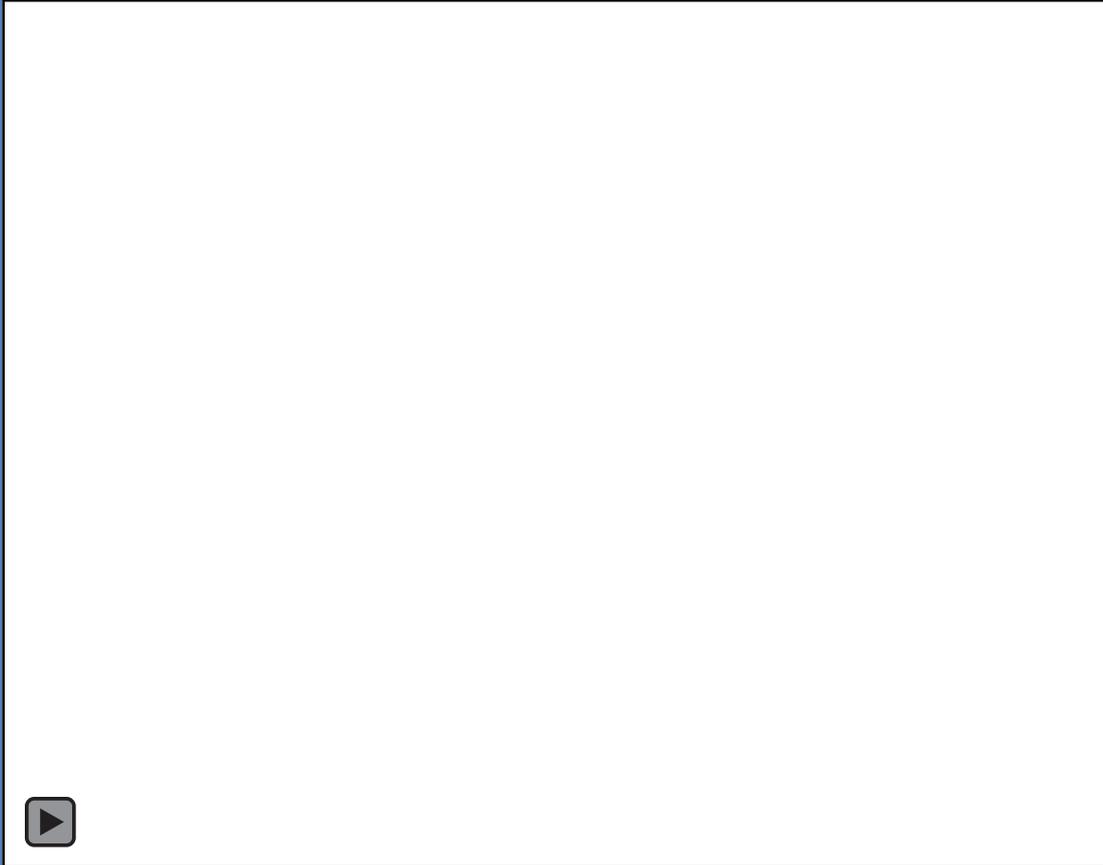
1. Remove four tamper proof screws on the door from the bottom of the base assembly.

2. Release the latch on the door to relieve pressure on the hinge.

3. Remove the battery door.

Battery door has access to sim card and battery.

# Hard Drive Disassembly



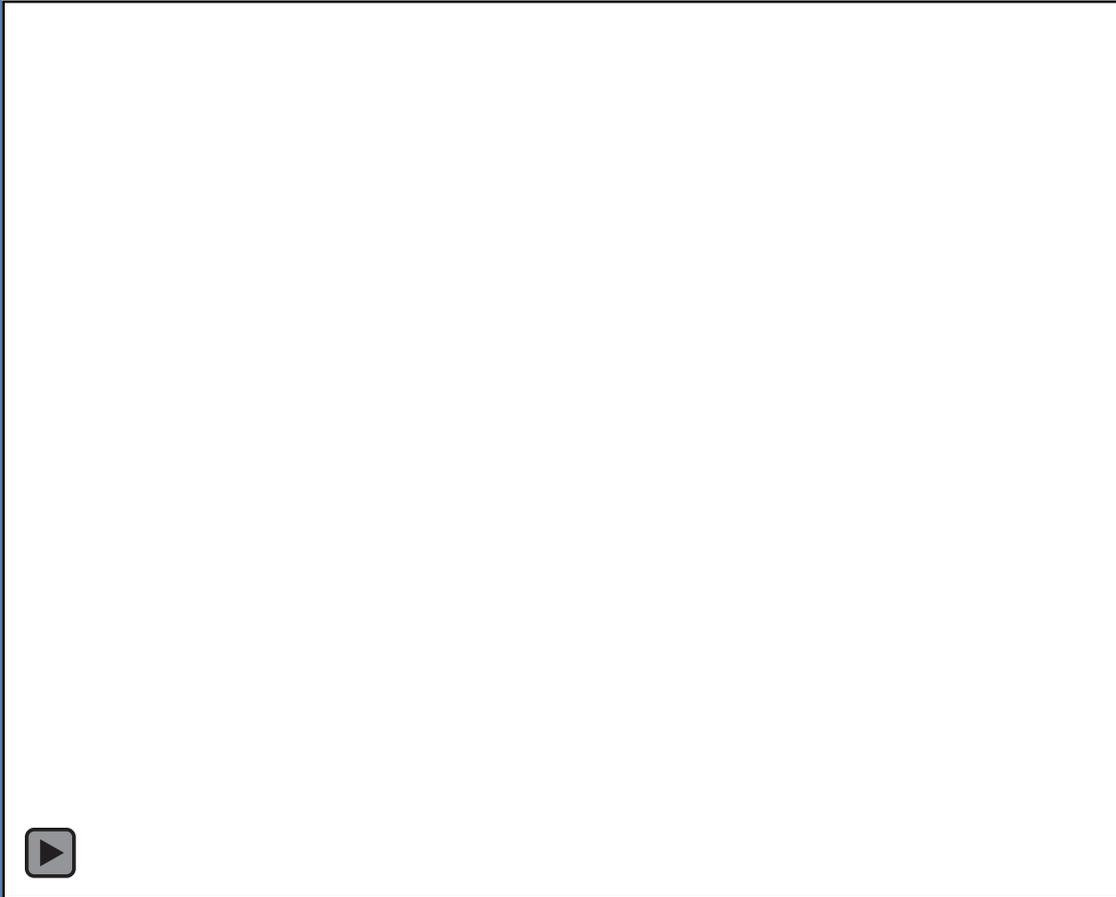
1. Release the latch to open the HDD door.

2. Push the blue locking button (1) while at the same time, pull the HDD out of the system (2).

3. Remove the four screws securing the hard drive to the hard drive module carrier.

4. Slide hard drive out of the carrier.

# Keyboard Disassembly



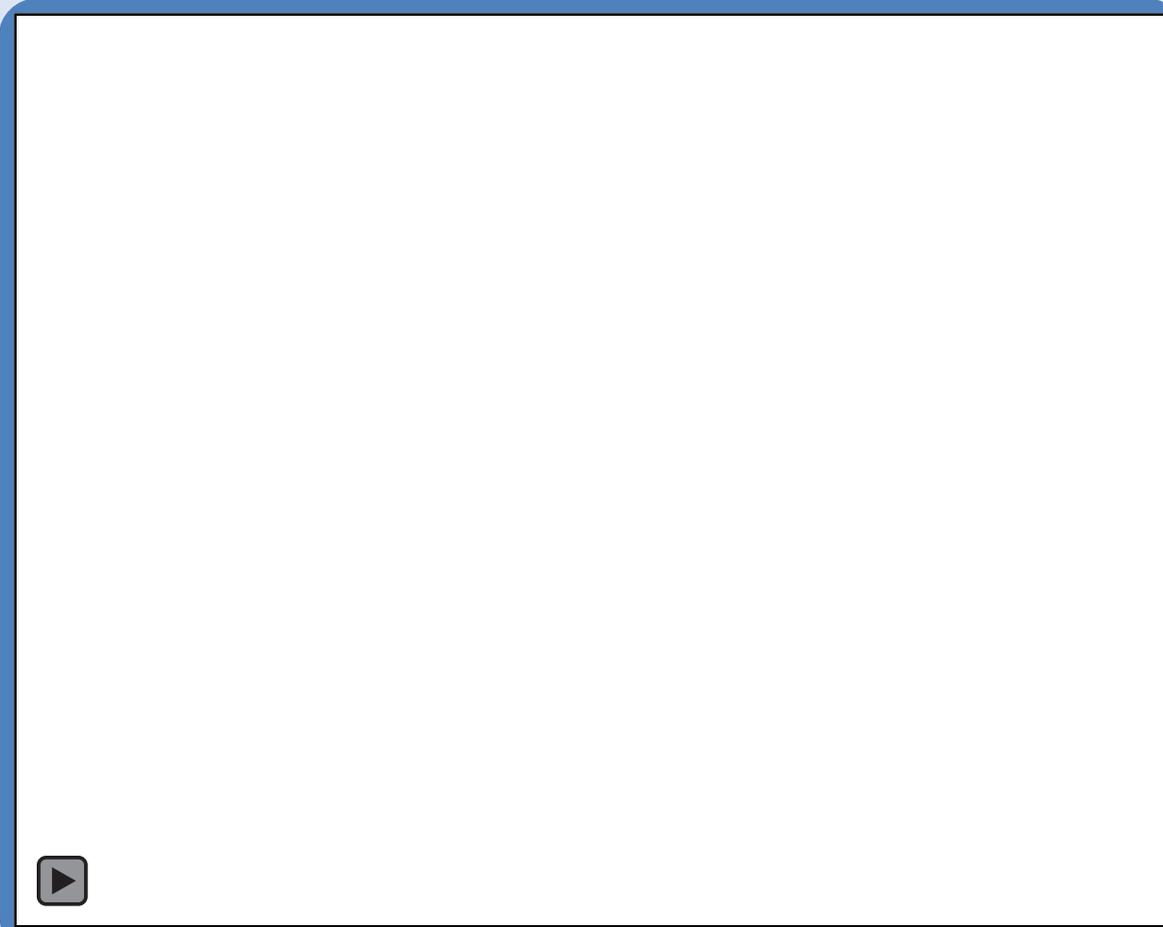
1. Slide open the docking door.
2. Loosen the 2 captive screws located inside the docking door.
3. Turn the system over and open the display.
4. Remove the two keyboard trim screws.
5. Lift the trim piece away to reveal the four screws securing the keyboard.
6. Remove the four screws in the keyboard bracket.
7. Lift up on the keyboard to release the snaps securing the left and right side of the keyboard and lean it against the LCD panel.
8. Remove the access door.
9. Peel off the security tape.
10. Disconnect the keyboard flex cable.
11. Remove the keyboard from the system.

# Display Assembly Disassembly



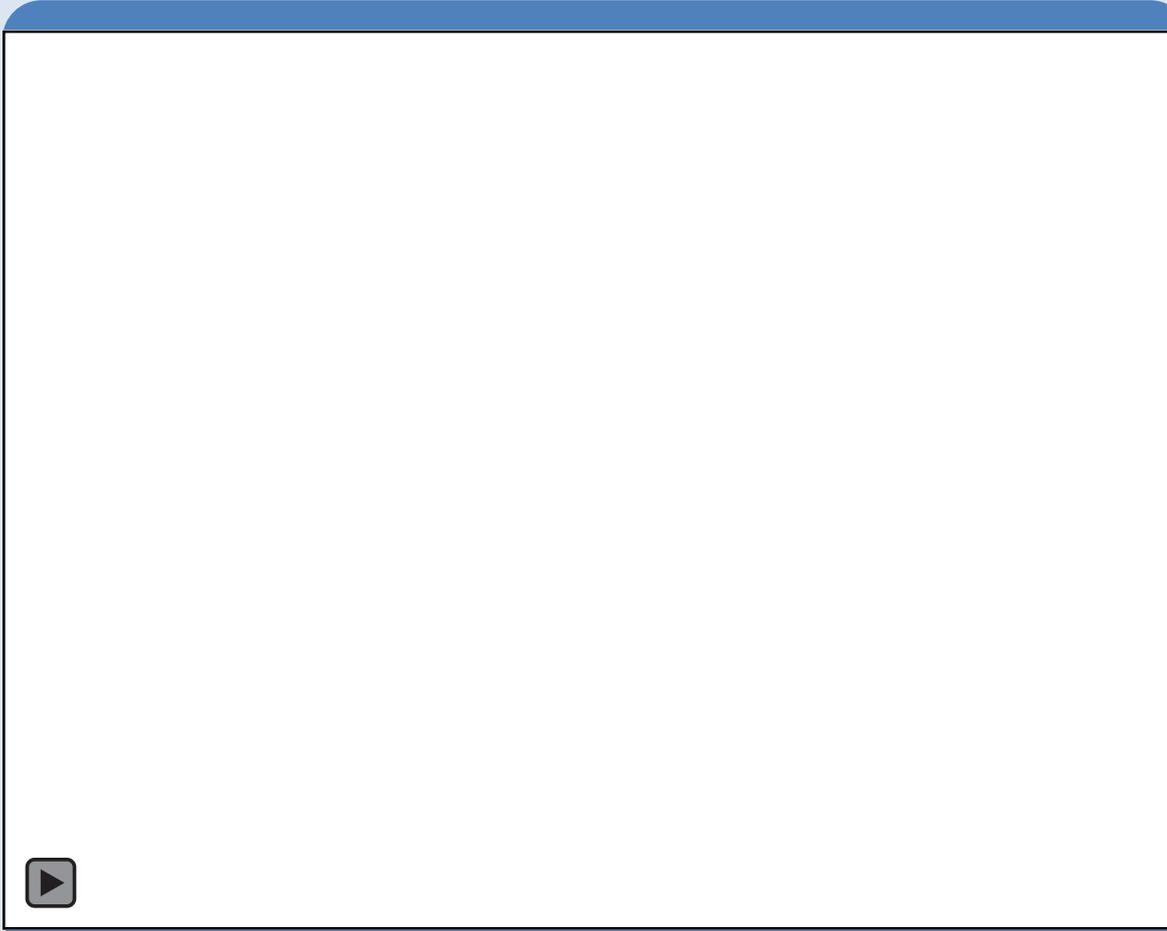
1. Remove the screw on the cable cover with LAN icon.
2. Remove the screw on the cable cover with DC-in icon.
3. Disconnect and unroute the antenna cables from the RF passthru, WLAN, WWAN, or WPAN if present.
4. Remove the 2 screws for the bracket holding the LVDS connector in place.
5. Pull the tab on the connector to disconnect the LVDS cable and the camera.
6. Remove the mylar cable cover.
7. (1) Unroute the LVDS cable from the base assembly and (2) remove the rubber grommets.
8. Remove the WWAN
9. Disconnect the touch controller USB
10. Remove the rubber grommets.
11. Remove the 6 screws from the hinges
12. Turn the computer topside up and lift up the display assembly.

# Palm-rest Disassembly



1. Remove the three screws from the bottom base.
2. Turn the system over. Remove the four screws securing the LED board access panel.
3. Lift up the LED board access panel.
4. Remove LED board cable, touchpad cable, Contactless Smartcard cable, and Fingerprint reader cable. (Prior to removing all the cables, remove the securing tapes)
5. Remove the eighteen screws on the top of the palmrest.
6. Lift the palmrest from the system.

# USB Board and Cable Disassembly



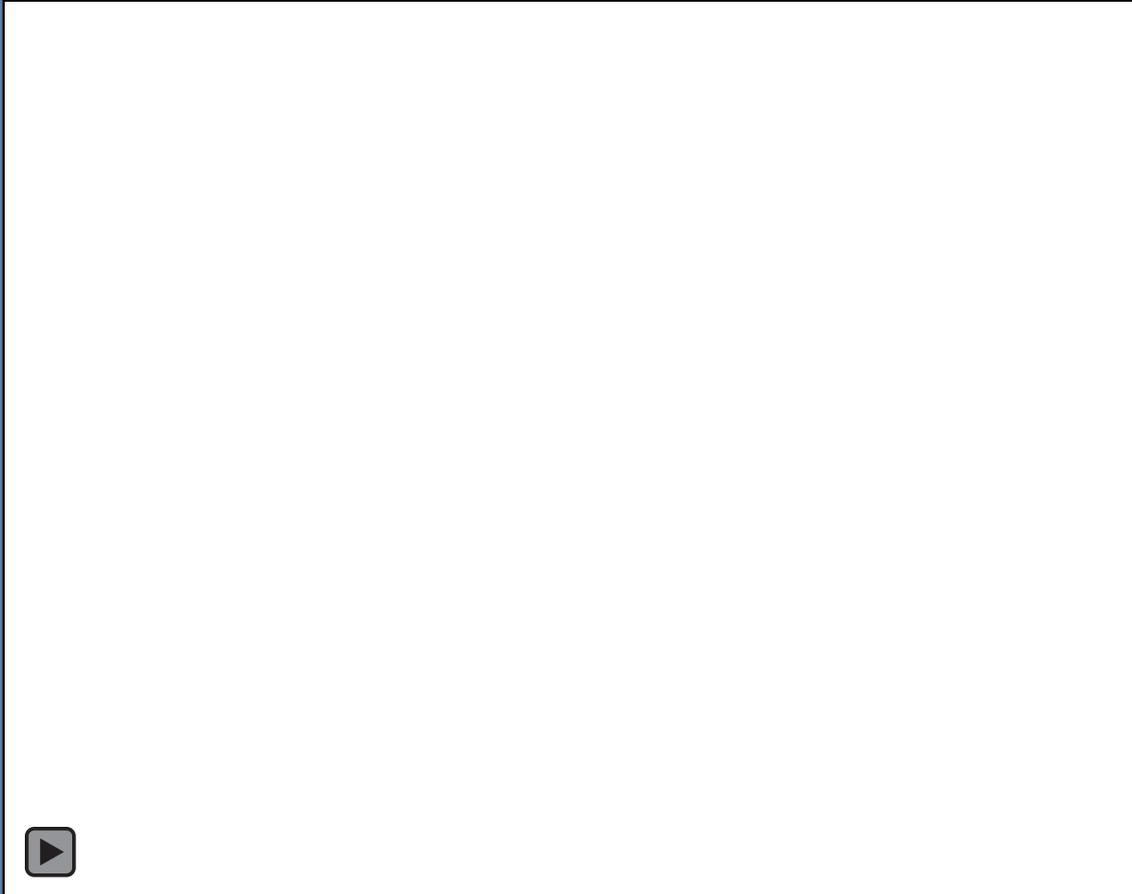
1. Unroute the USB board cable and disconnect the end from the system board.
2. Disconnect the USB cable from the USB Board.
3. Remove the screw securing the USB board bracket.
4. Remove the USB board bracket.
5. Remove two screws from the USB board.
6. Open the Media Bay door.
7. Slide the USB board out of the chassis through the media bay door.

# Handle Disassembly



1. Remove 2 screws from the top of the handle.
2. Remove 2 screws securing handle pin to chassis.
3. Remove the carry handle from the sockets by sliding the handle up.

# System Board Disassembly



1. Remove 1 screw on the I/O board.
2. Disconnect and remove audio cable and USB cable.
3. Disconnect DC-in cable, smart card cable, and media board cable from the system board.
4. Remove 4 screws on the system board.
5. Starting from the top left edge, disconnect the system board from the I/O board connection.
6. Lift up and rotate the system board from the chassis.
7. Disconnect the speaker cable.
8. Remove the system board.

# LCD Bezel Disassembly



1. Remove the four screws at the corners of the back cover.
2. Remove the 10 screws securing the right and left antenna covers to the display assembly.
3. Slide out the left and right antenna covers.
4. Remove the 18 screws securing the display bezel to the display assembly.
5. Remove the display bezel from the display assembly.

# LCD Panel and Dampeners

1. Remove the tape and disconnect the touch screen cable.

2. Using a plastic scribe, lift up the right side of the LCD Panel. Gently turn the LCD panel 180 degrees towards the keyboard.

3. Unlock the LVDS retainer clip and pull out the LVDS connector from the LCD panel.

4. Remove the LCD panel.

5. Remove the dampeners.



# SUMMARY

# SUMMARY

## You are now able to:

- ✓ Explain the positioning of the Ruggedized Notebooks portfolio and list the products within the portfolio
- ✓ Define safety and troubleshooting best practices, state commonly required tools, and list additional technical resources available
- ✓ For each of the Ruggedized Notebook Common and Specific Need to Know procedures, recall the disassembly and reassembly procedure demonstrated.



# Prior to Certification

Prior to Certification you should:

- Ensure you are fully comfortable with all of the material presented in this course, especially the information in the **Fundamentals** and the **Need to Know** sections.
- Explore the product documentation for each of the product families presented in the Products Portfolio section of this course.
- Explore the disassembly and reassembly procedures in the **Need to Know** sections for components with which you are unfamiliar.



# Ruggedized Notebooks Certification

Question 1 of 21

Which checks should you perform when you suspect a faulty processor?

- HDD
- Thermal and Beep Codes
- Memory
- PSU BIST



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