

Smarter technology for all

Servicing the Lenovo ThinkEdge SE450

ES52328B
June 2023



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Lenovo

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Preface

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Current release date: June 2023

Current release level: 2.1

The information in this publication is current as of the date of the latest revision and is subject to change at any time without notice.

To provide feedback or receive more information about this course, send an e-mail to:

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Prerequisites

- ES51757B – Introducing ThinkSystem tools
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51757B>
- ES41759B – ThinkSystem problem determination
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES41759B>
- ES51780C – Servicing Lenovo ThinkSystem storage controllers
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51780C>
- ES42108B – ThinkSystem V2 architecture introduction
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES42108B>
- ES71911C - Servicing the Lenovo ThinkSystem SE350 Edge Server
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES71911C>
- ES51965 - Introducing the Intel Optane DC persistent memory module
<https://lenovoedu.lenovo.com/course/view.php?idnumber=ES51965>

Objectives

After completing the course, you will be able to:

- Describe the ThinkEdge SE450 and its components
- Describe the features and specifications of the ThinkEdge SE450
- Describe the different PCIe and storage configurations of the ThinkEdge SE450
- Describe the ThinkShield support available on the ThinkEdge SE450
- Describe the problem determination steps and explain how to troubleshoot issues with the ThinkEdge SE450

What's new

Root of Trust module and Security Pack



New features

Attention:

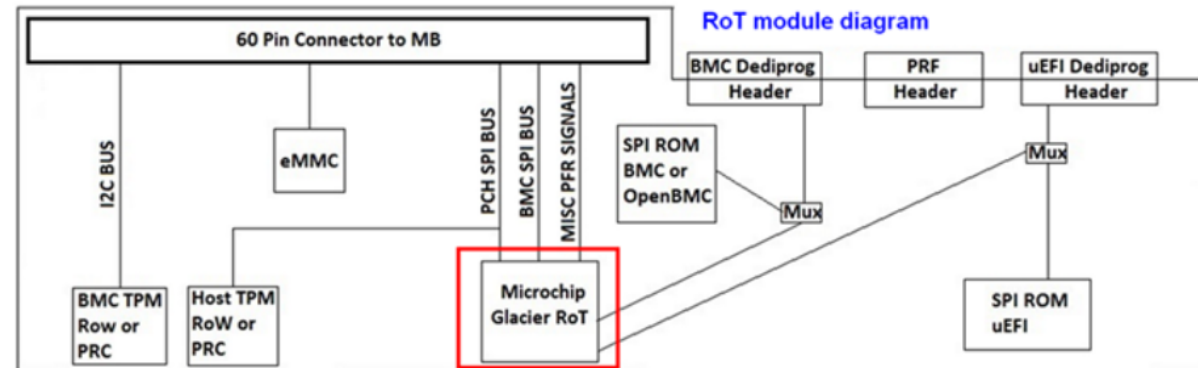
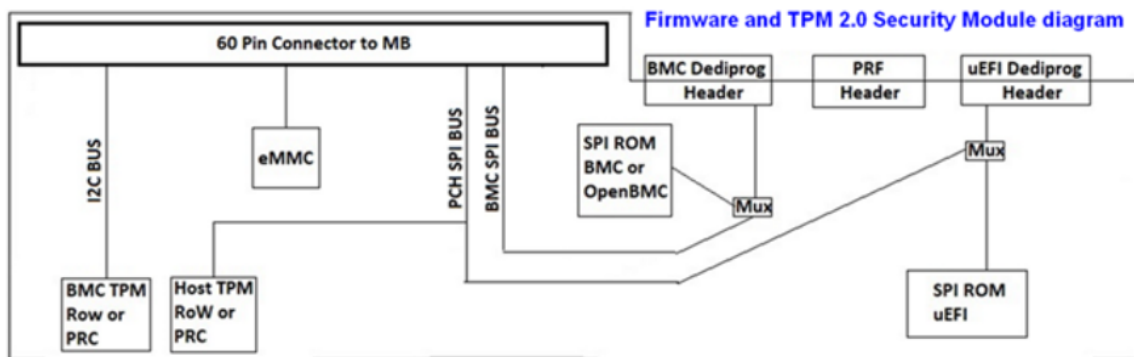
No support for 5G as a client: The SE450 does not offer any 5G or LTE Wireless client support. The 5G network LEDs are non-operational.

The major SE450 updates in the fourth quarter of 2022 are as follows:

- Firmware and Root of Trust (RoT) security module:
 - A new optional firmware and Root of Trust (RoT) security module is available for the SE450, and it provides an additional layer of security which can be used by customers who have high regulatory requirements or high security standards.
 - This firmware and RoT security module is installed in the same place as the firmware and TPM 2.0 security module. Customers can choose to have either the firmware and TPM 2.0 security module or firmware and RoT security module installed in the chassis.
- SE450 with Security Pack model:
 - Security Pack Enabled feature (feature code BLZ2)
 - As with the SE350 with Security Pack model, this model supports security features and needs to be activated before use

Firmware and RoT security module in the SE450

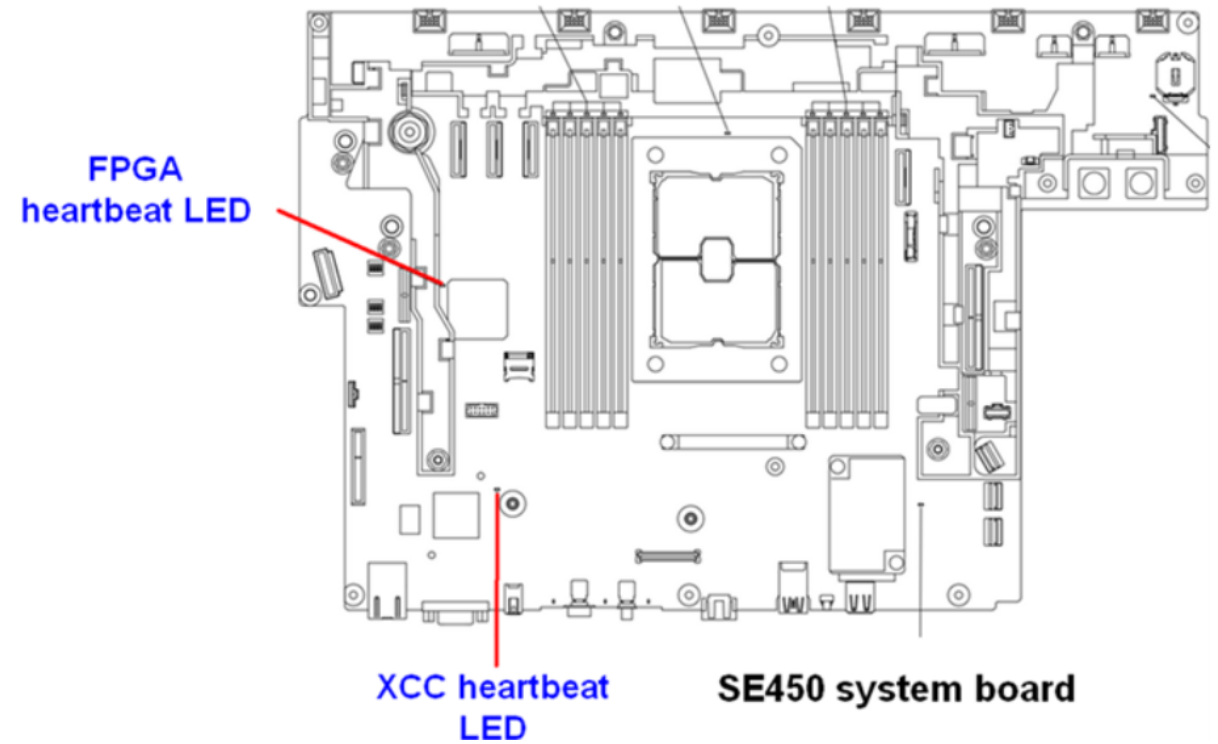
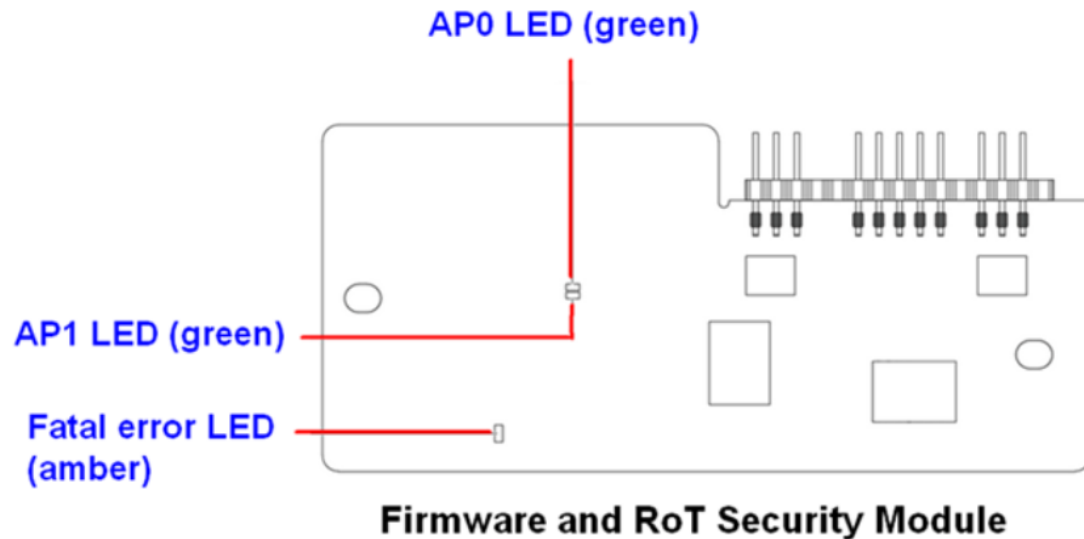
The firmware and RoT security module for the SE450 is based on the firmware and TPM 2.0 security module mezzanine card in the SE450, but it has an additional active RoT microchip. In the following diagrams, you can see the RoT microchip on the firmware and RoT module.



Firmware and RoT security module troubleshooting

The servicing and troubleshooting procedures for the firmware and RoT security module are the same as those for the firmware and TPM 2.0 security module. Refer to the [Firmware and TPM 2.0 security module troubleshooting](#) page in this course for more information.

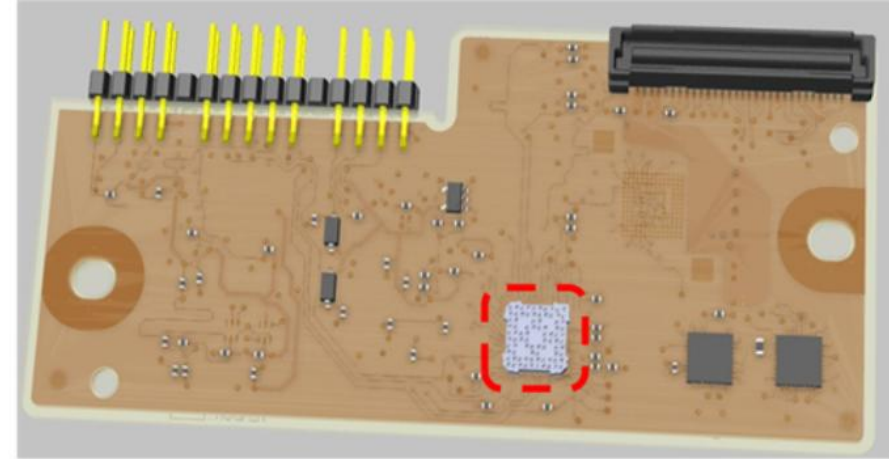
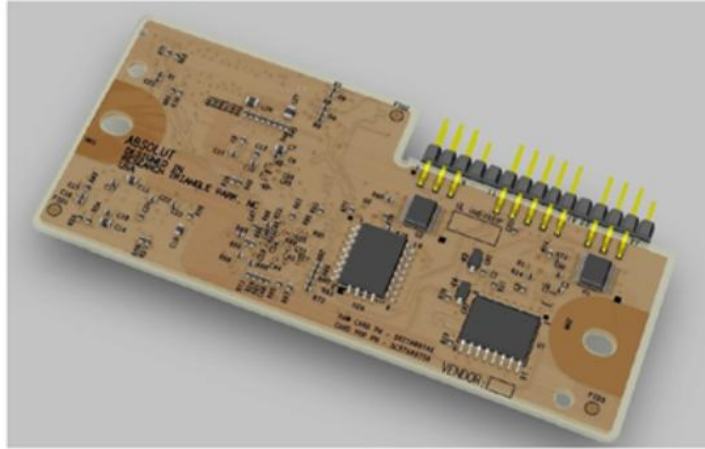
The firmware and RoT security module has additional LEDs that can help with the further investigation of issues. Servicers can use the LEDs on the firmware and RoT security module and on the system board to identify issues. Refer to the next page for descriptions of these LEDs.



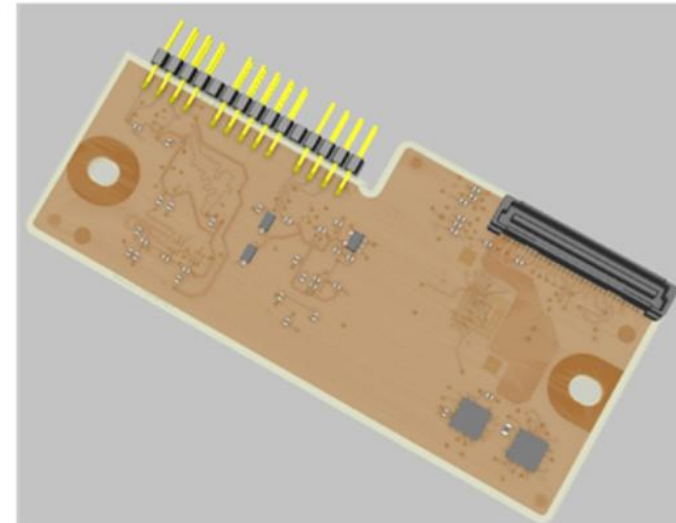
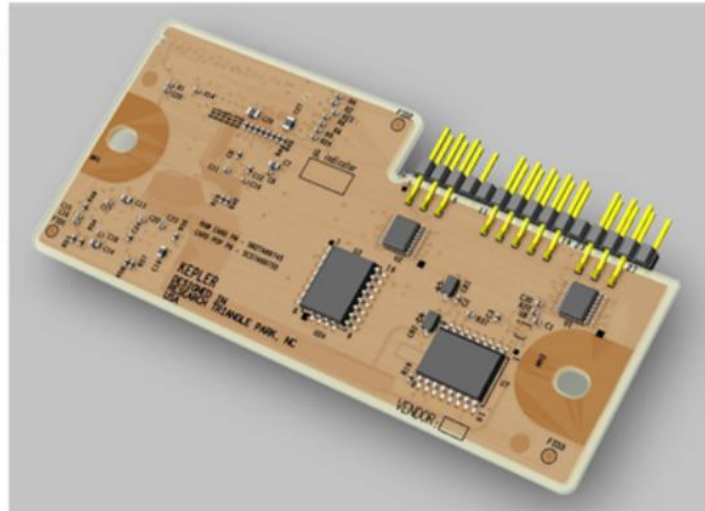
What's new

RoT and firmware and TPM 2.0 security module appearance

RoT



Firmware
and TPM
2.0 security
module



Firmware and RoT security module LEDs

Scenario	AP0 LED	AP1 LED	Fatal error LED	FPGA heartbeat LED	XCC heartbeat LED	Actions
RoT security module fatal firmware failure	Off	Off	On	N/A	N/A	Replace the firmware and RoT security module
	Blinking	N/A	On	N/A	N/A	Replace the firmware and RoT security module
	Blinking	N/A	On	On	N/A	Replace the firmware and RoT security module
No system power (FPGA heartbeat LED off)	Off	Off	Off	Off	Off	<p>If AC power is on, but the system board does not have power:</p> <ol style="list-style-type: none"> 1. Check the power supply units (PSU) or power distribution board (PDB). If there is a PSU or PDB error, replace the defective PSU or PDB. 2. If the PSU or PDB is good, replace the system board (trained technicians only).

Firmware and RoT security module LEDs

Scenario	AP0 LED	AP1 LED	Fatal error LED	FPGA heartbeat LED	XCC heartbeat LED	Actions
						<p>(PSU) or power distribution board (PDB). If there is a PSU or PDB error, replace the defective PSU or PDB.</p> <p>2. If the PSU or PDB is good, replace the system board (trained technicians only).</p>
XCC firmware recoverable error	Blinking	N/A	Off	N/A	N/A	Information only – no action is required
XCC firmware has recovered from an error	On	N/A	Off	N/A	N/A	Information only – no action is required
UEFI firmware authentication failure	N/A	Blinking	Off	N/A	N/A	Information only – no action is required
UEFI firmware has recovered from an authentication failure	N/A	On	Off	N/A	N/A	Information only – no action is required
System is OK (FPGA heartbeat LED is On)	On	On	Off	On	On	Information only – no action is required

SE450 with Security Pack model

The Security Pack Enabled feature (feature code BLZ2) is available for the SE450. As with the SE350 with Security Pack, the SE450 with Security Pack model needs to be claimed and activated before use. Refer to education course [ES71911C - Servicing the Lenovo ThinkSystem SE350 edge server](#) for information about Security Pack features and tools that can be used to claim and activate the SE450.

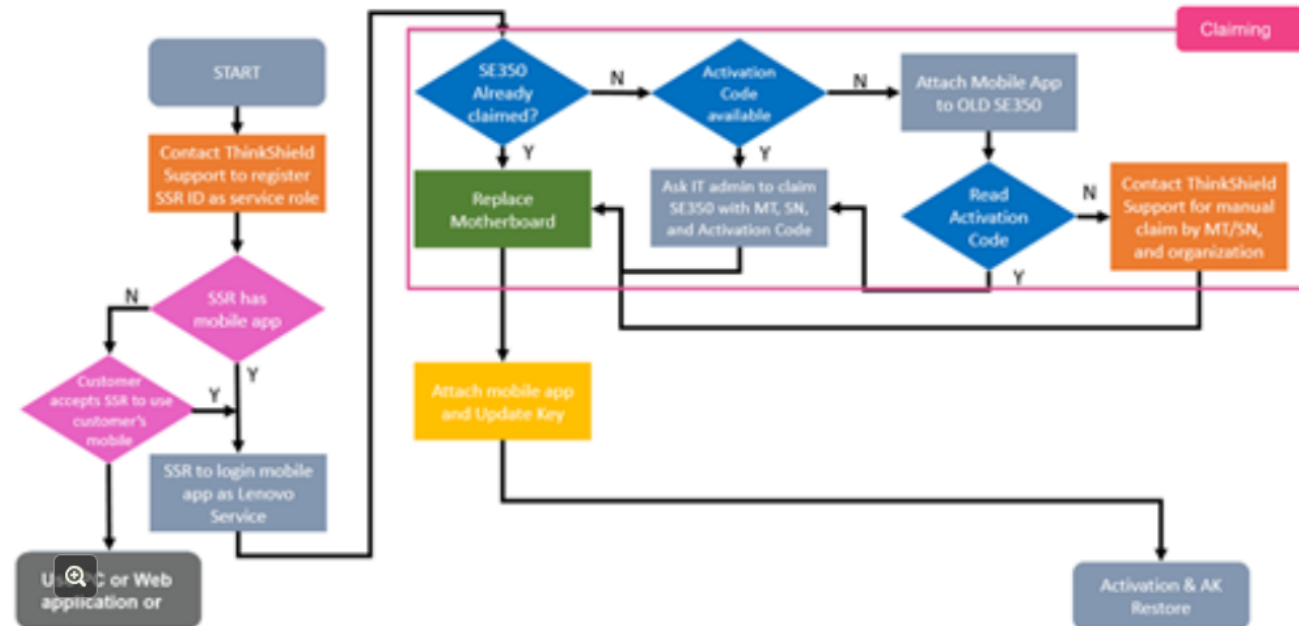
e the SE450.

SE450 with Security Pack Enabled	SE450 with Security Pack Disabled (initial release)
<ul style="list-style-type: none">• SE450 automatic data protection can be enabled – this includes the intrusion sensor and motion sensor• SED data access can be locked after tamper events• The system will need to be claimed and activated in order to unlock and access data• Must be activated to boot up and become fully functional• The Secure Activation Code is used when claiming the system for activation or when the system board is replaced	<ul style="list-style-type: none">• SE450 Standard model• SE450 automatic data protection is disabled• Data access will never be locked up, SED AK management based on passphrase, and the tamper setting is disabled• No activation is required• Claiming the system is optional, but the Secure Activation Code would be needed

SE450 system board replacement process

The SE450 with Security Pack Enabled model and Security Pack Disabled model have different system boards. Make sure you use the correct FRU number when ordering a replacement system board.

The system board servicing procedure for the SE450 Standard model is the same as that used with ordinary servers, meaning there is no need to reactivate and claim the device. However, when working with the SE450 with Security Pack Enabled model, servicers should follow the SE350 System board replacement flow chart to update the device key, activate, and restore the SED AK.



SE450 ThinkShield Activation LED

The previously reserved ThinkShield Activation LED is now functional on the SE450.

The LED states are as follows:

Solid on: ThinkShield is activated

Blinking: ThinkShield is not activated and needs to be activated

Off: ThinkShield is not available on this unit (Security Pack disabled)



ThinkShield Activation
LED (green)



SE450 Security Pack behavior in XCC – System Lockdown mode

Tamper detection (Chassis Intrusion Detection) is enabled when the system is configured to Security Pack mode. The SED AK will be locked if tampering is detected.

The screenshot displays the XClarity Controller web interface. On the left is a dark sidebar with navigation links: Home, Events, Inventory, Utilization, Remote Console, Firmware Update, Server Configuration, BMC Configuration, Backup and Restore, License, Network, and Security (highlighted with an orange box). The main content area is titled 'Lenovo System' and shows the 'System Lockdown Mode' configuration page. At the top right, there is a toggle switch for 'System Lockdown Mode' set to 'Inactive'. Below this, a yellow warning box states: 'Chassis Intrusion Detection' is in disabled state, system now loses the capability to detect chassis intrusion event and trigger lockdown mode automatically when someone opens enclosure top cover unexpectedly. The 'Motion Detection' section is highlighted with a red box and contains a red text overlay: 'Motion detection is not supported on the SE450'. This section includes a toggle switch set to 'Enabled', a 'Sensitivity Level' dropdown set to 'Low', and an 'Orientation' dropdown set to 'Stand Desktop'. Below this, 'Chassis Intrusion Detection' is shown as 'Disabled'. There are 'Apply' and 'Cancel' buttons at the bottom of the configuration area. The 'SED Authentication Key (AK) Manager' section is visible below, with options to 'Change the SED AK', 'Backup the SED AK', and 'Recover the SED AK'. The 'ThinkShield Key Vault' logo is present in the bottom right corner.

What's new

SE450 Security Pack behavior in XCC – SED AK Management

Additional SED AK management methods are supported when the system is configured to Security Pack mode. If Standard mode is chosen, only one SED AK management method will be available.

