CompTIA A+ Core 1 Exam 220-1101

Lesson 3

Troubleshooting PC Hardware

Objectives

- Apply troubleshooting methodology
- Configure BIOS/UEFI
- Troubleshoot power and disk issues
- Troubleshoot system and display issues

Lesson 3

Topic 3A

Apply Troubleshooting Methodology

Best Practice Methodology

- Problem solving
  - Causes, symptoms, consequences
- Context
  - Corporate policies, procedures, impacts

- CompTIA troubleshooting model
  1. Identify the problem
  2. Establish a theory
  3. Test the theory
  4. Establish an action plan
  5. Verify full system functionality
  6. Document findings

Identify the Problem

- Gather information from users
  - Identify user changes
  - Inquire regarding environmental or infrastructure changes
- Perform backups before making changes

Establish and Test a Theory

- Establish a theory
  - From possible causes to probable cause
- Conduct internal or external research
  - Physical inspection
  - Internal documentation and support resources
  - External vendor and forum resources
- Question the obvious
  - Attention to detail
  - Step through what should happen
  - Compartmentalize the issue

Establish a New Theory or Escalate

- Establish a new theory
  - Question the obvious (again)
  - Consider alternatives/workarounds
  - Take system “back to base”
- Escalate
  - Escalation paths
  - Communicate support case status

Implement a Plan of Action

- Next steps
  - Repair, replace, workaround
  - Risks from costs and impacts
- Establish a plan of action
  - Consider impacts
  - Consider corporate policies, procedures, and impacts before implementing changes
- Implement the solution
  - Change management and scheduling
  - Refer to vendor instructions

Verify and Document

- Verify full system functionality
  - Perform tests
  - Obtain user acceptance
- Implement preventive measures
- Document findings, actions, and outcomes
  - Ticketing systems

Review Activity: Troubleshooting Methodology

- Best Practice Methodology
- Identify the Problem
- Establish and Test a Theory
- Establish a New Theory or Escalate
- Implement a Plan of Action
- Verify and Document

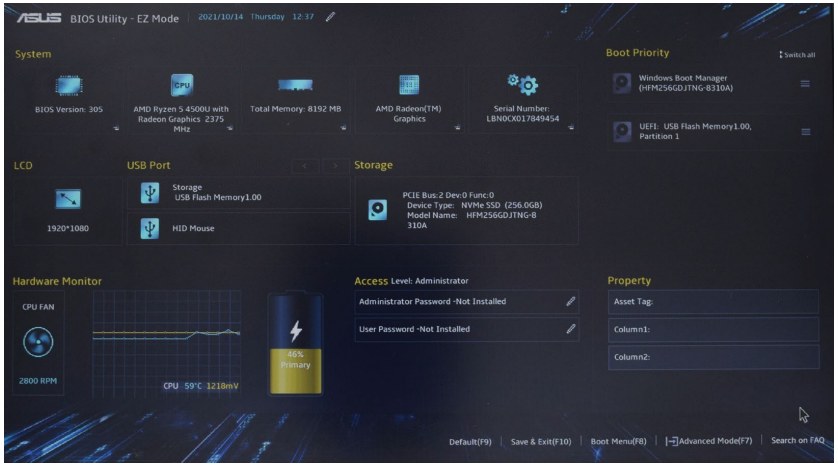
Lesson 3

Topic 3B

Configure BIOS/UEFI

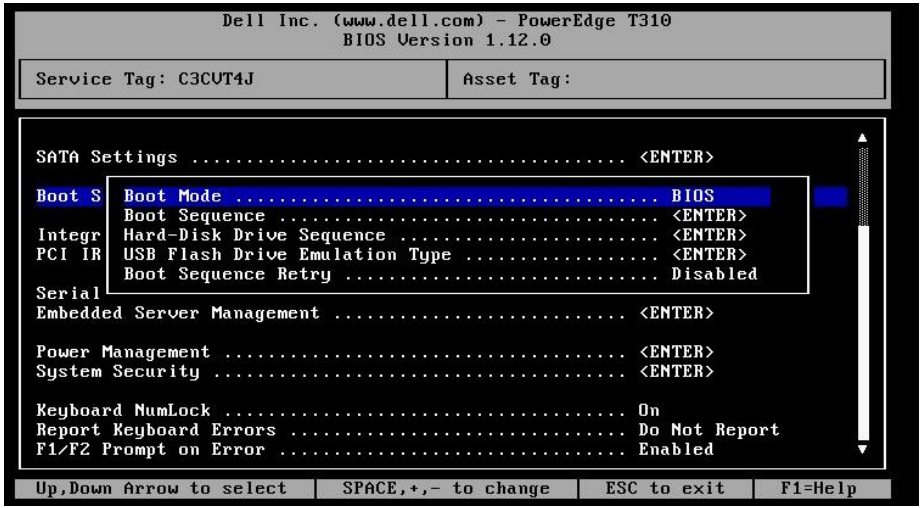
BIOS and UEFI

- System firmware
- Basic Input/Output System (BIOS)
- Unified Extensible Firmware Interface (UEFI)
- Accessing system setup



Screenshot used with permission from ASUSTek Computer Inc.)

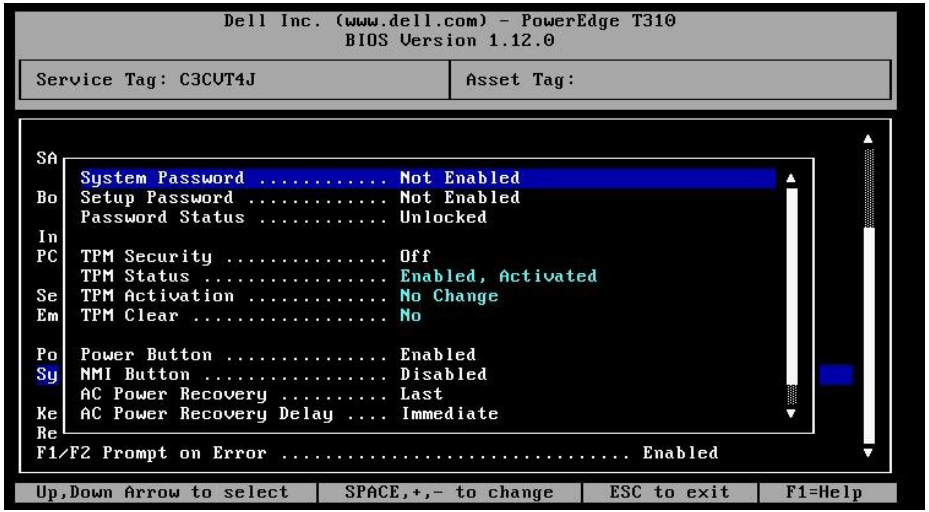
Boot and Device Options



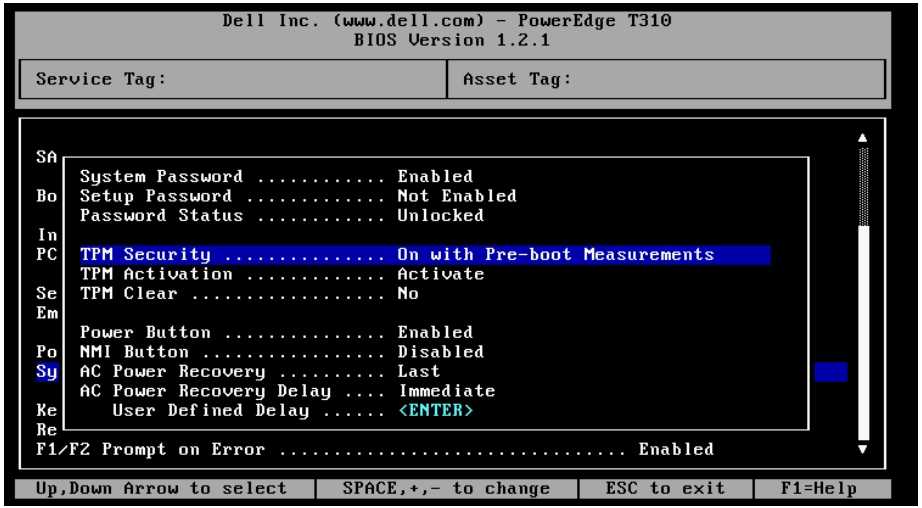
- Boot device selection and priority
- USB permissions
- Fan considerations

Boot Passwords and Secure Boot

- System password
- User password
- Secure boot



Trusted Platform Modules



- Encryption and cryptographic keys
- Hashes
- Trusted platform module (TPM)
  - Root of trust
  - Secure key storage
- Hardware security module (HSM)

Review Activity: BIOS/UEFI

- BIOS and UEFI
- Boot and Device Options
- Boot Passwords and Secure Boot
- Trusted Platform Modules

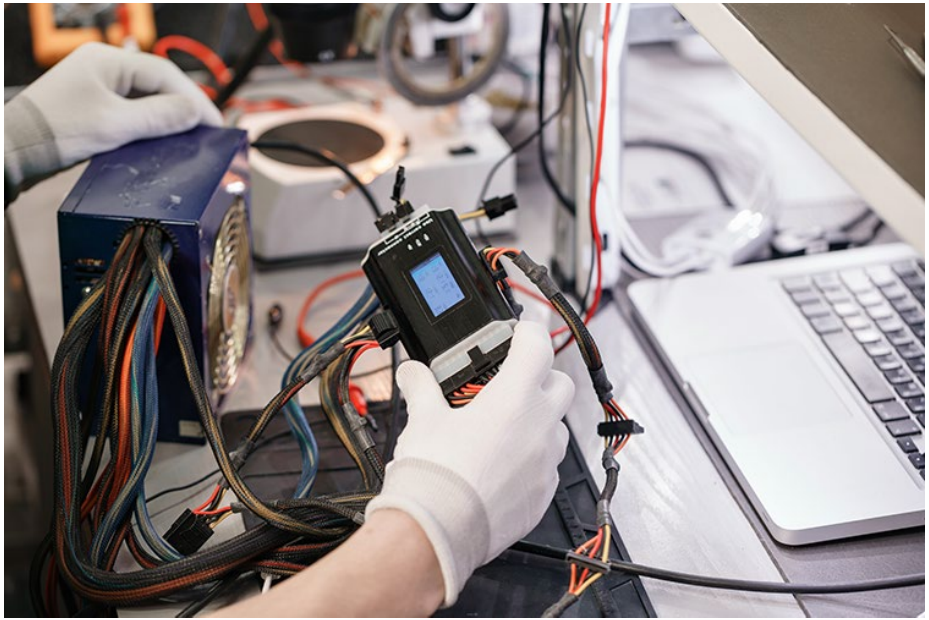
Lesson 3

Topic 3C

Troubleshoot Power and Disk Issues

Troubleshoot Power Issues

- No power symptoms
  - No indicator lights
  - Fans do not start
- Possible causes
  - Circuit fault or power blackout
  - Socket fault
  - Switches and cables/connectors
  - Overloaded and faulty devices
- Power supply testing

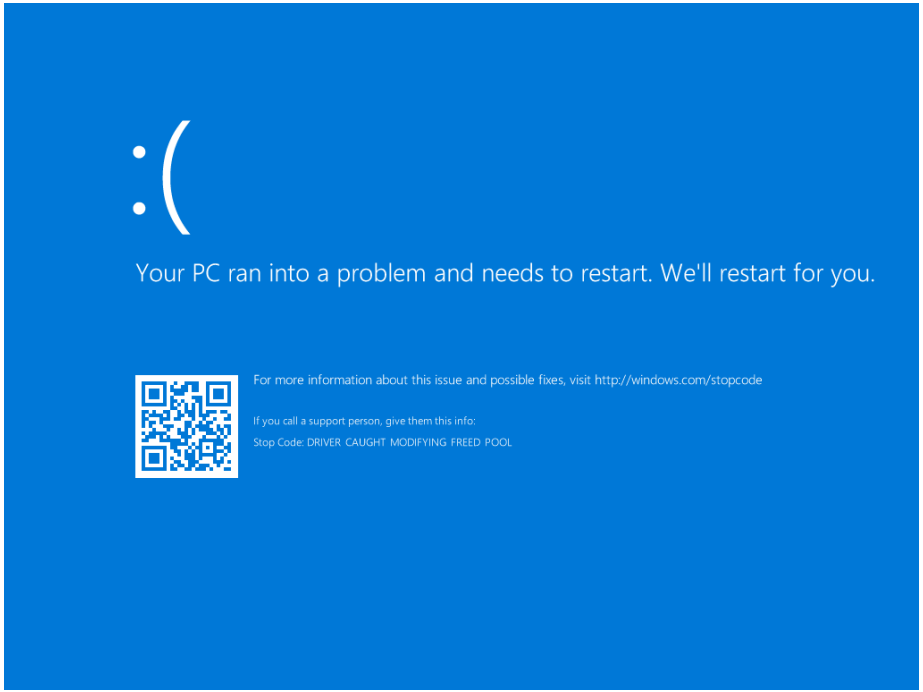


Konstantin Malkov @123RF.com

Troubleshoot POST Issues

- Power-on self-test (POST)
- Black screen
  - Failed firmware update
  - Faulty cabling/connector/device
  - Faulty PSU or CPU
- Beep codes

Troubleshoot Boot Issues



Screenshot courtesy of Microsoft

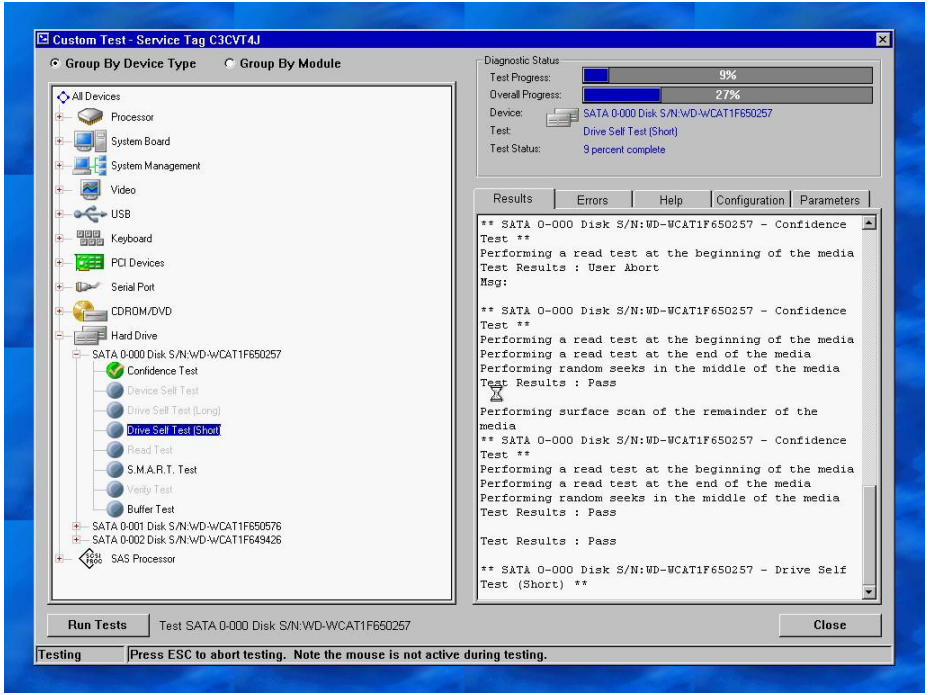
- Boot device
  - Boot sequence
  - Power and data connectors and cabling
- Boot sector
  - Damage to boot/partition records
- OS errors and crash screens
  - Hardware fault or OS/driver fault

Troubleshoot Drive Availability

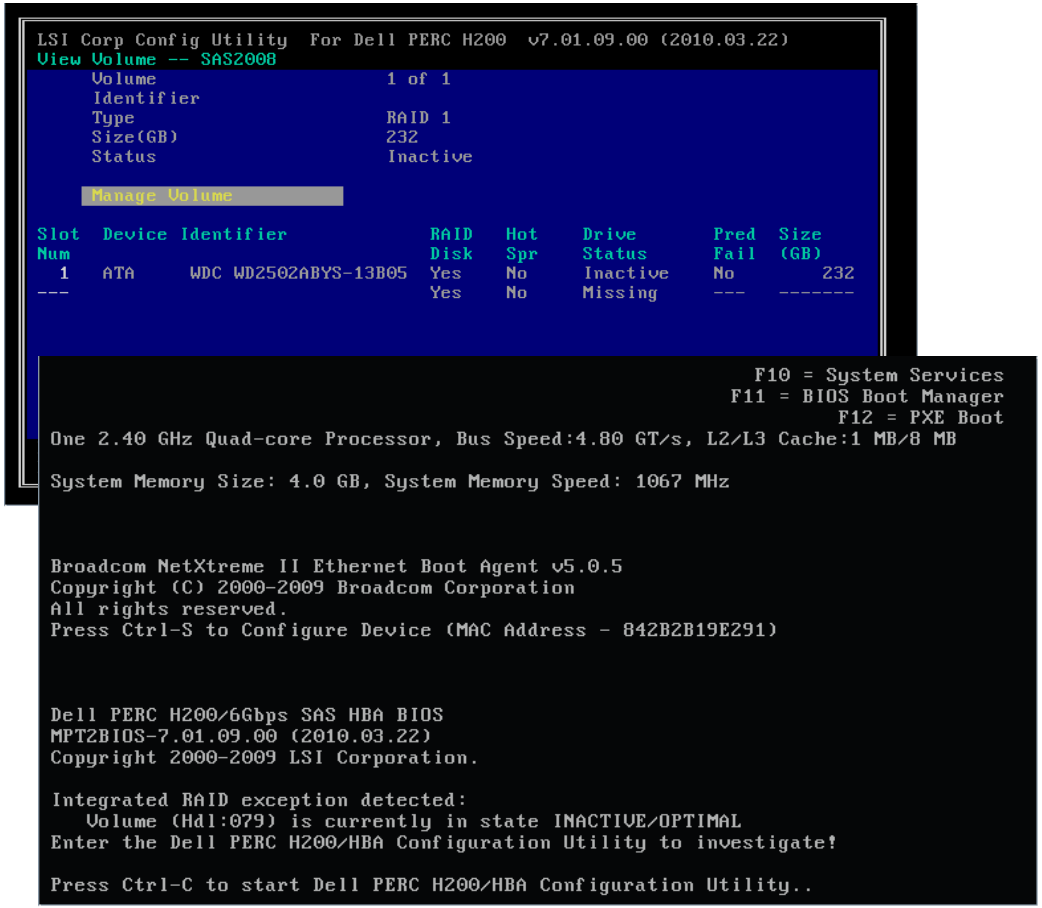
- Unusual noises
- Light-emitting diode (LED) status indicators
  - No LED activity
  - Constant LED activity
- Missing drives in OS
- Read/write failure
- Blue Screen of Death (BSoD)

Troubleshoot Drive Reliability and Performance

- Self-monitoring, Analysis, and Reporting Technology (SMART)
  - Report errors
- Vendor and third-party diagnostic utilities
  - Input/output operations per second (IOPS) measurement
  - Benchmark performance without interference from OS/app causes
- Data loss/corruption
  - Bad sectors and bad blocks
- Backup and data recovery



Troubleshoot RAID Failure



- RAID array degraded
  - Backup
  - Replace failed device
- RAID device not found
  - Controller seating/cables/connectors
  - Drivers
  - RAID configuration utility

Review Activity: Power and Disk Issues

- Troubleshoot Power Issues
- Troubleshoot POST Issues
- Troubleshoot Boot Issues
- Troubleshoot Drive Availability
- Troubleshoot Drive Reliability and Performance
- Troubleshoot RAID Failure

Lesson 3

Topic 3D

Troubleshoot System and Display Issues

Troubleshoot Component Issues

- Intermittent shutdown and application crashes
  - Software versus hardware causes
- Overheating and burning smells
    - Clean chassis, heatsinks, and fans
    - Verify airflow
- Physical damage
  - Bent pins and other connector/cabling damage
  - Component/adapter seating (chip creep)
  - Capacitor swelling

Troubleshoot Performance Issues

- Check for overheating
  - CPU throttling/overheating
- Check for misconfigurations
  - What has changed?
- Verify the problem
  - Use diagnostic software to quantify performance loss
  - Identify best opportunity for upgrade (compute, storage, networking)
- Rule out operating system/app/configuration/networking issues

Troubleshoot Inaccurate System Date/Time

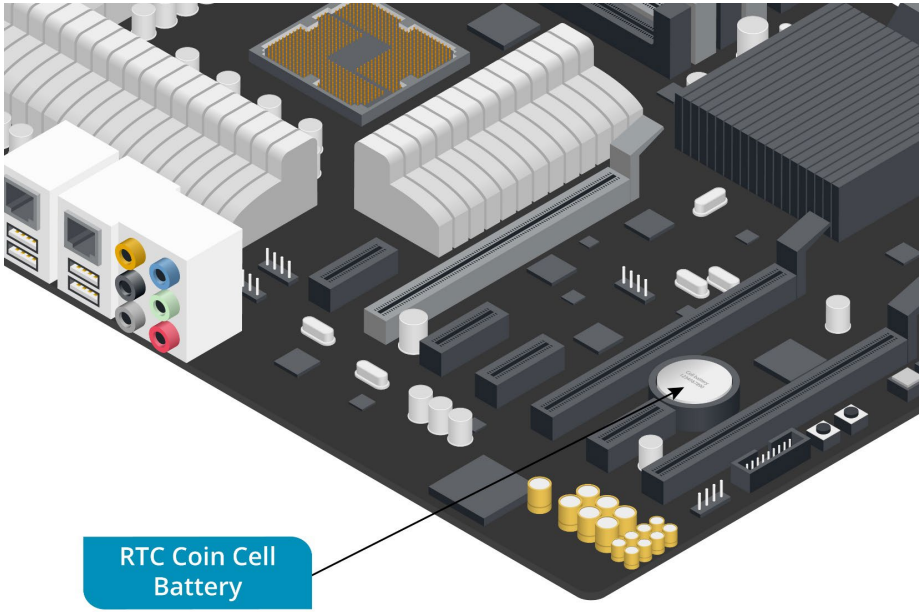


Image @123RF.com

- Problems caused by inaccurate date/time
- Real time clock (RTC) battery replacement

Troubleshoot Missing Video Issues

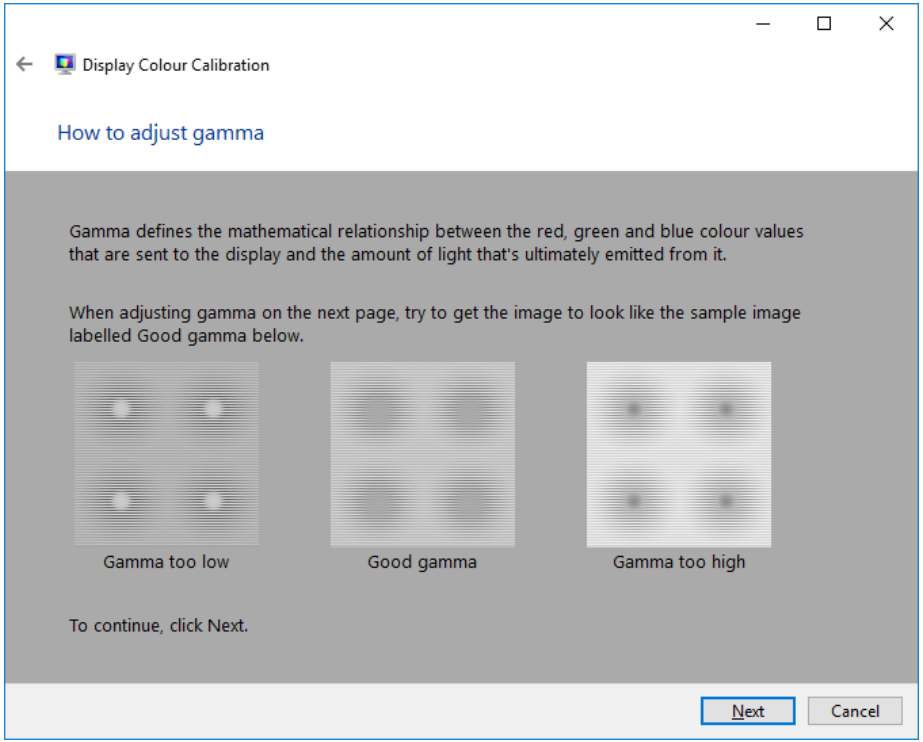
- Incorrect data source
  - Adapter outputs and monitor inputs
  - On-screen display (OSD)
- Physical cabling issues
  - Damaged connectors
  - Cable application/performance
- Burned-out bulb
- Intermittent projector shutdown

Image @123RF.com

Troubleshoot Video Quality Issues (Slide 1 of 2)

- Dim image
  - OSD controls
  - Power saving modes
  - Backlight failure
- Fuzzy image
- Flashing screen
  - Faulty connector, display elements/backlight, or video card

Troubleshoot Video Quality Issues (Slide 2 of 2)



Screenshot courtesy of Microsoft

- Dead pixels
- Burn-in
- Incorrect color display
  - Accurate calibration
  - Connector/adapter/cable faults
- Audio issues

Review Activity: System and Display Issues

- Troubleshoot Component Issues
- Troubleshoot Performance Issues
- Troubleshoot Inaccurate System Date/Time
- Troubleshoot Missing Video Issues
- Troubleshoot Video Quality Issues

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Summary