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ventilation system management power management and performance 0) Using Utility Computer Setup (f10) Utility Computer Setup (f10) Utility File Computer Setup (f10) Utility Storage Computer Setup (f10) Utility Security Computer Setup Power Computer Setup Advanced Desktop Management Initial Computer Configuration and Deployment v6 Remote System Copy a Setup Configuration Software HP Client Management Solutions Altrix Client Management Solutions HP Softpak Download Manager System Software Manager ROM Flash Remote ROM Flash HPQFlash Felsafe Boot Block Using Felsafe Boot Block Recovery Mode Fixing the computer by installing a setup password by using the Workstation Security Asset Tracking SATA Hard Drive Security DriveLock app DriveLock password protection using the Computer Setup (f10) utility using the Computer Setup (f10) utility using the Computer Setup (f10) utility Entering power-on password by entering power-on password or setup password removing a power-on or setup password national keyboard delimitation characters clearing password chassis security smart cover sensor (optional) side access panel solenoid lock cable lock (optional) fault notification and recovery ECC fault prediction thermal sensor programmable power button (Windows only) power button configuration (Windows only) component replacement information and guidelines change warning and service idea tools and software Warns requirements electrostatic discharge (ESD) information v7 product recycling component replacement guidelines battery cable management CPU (processor) and CPU heatsync expansion slot card configuration restrictions an extension card slot for power supply SFF workstation slot identification and description SFF workstation installation sequence recommendations tower workstation slot identification and description tower workstation selection installation sequence recommendations hard drive and optical disk drive hard drive removal and replacement suggestions drive installation and cabling scenarios SFF Workstation SATA Cable Connection Guidelines Tower Workstation SATA Cable Connection Guidelines Memory Supported DIMM Configuration BIOS Handling Errors and Warning DIMM Installation Guidelines SFF Workstation DIMM Installation Order Power Supply Power Supply Specifications Power Consumption and Heat Dissipation Power Supply System System Cabling SFF Workstation System Cabling Tower Workstation System Cabling Diagnostics and Troubleshooting Support Detection Warranty Detection Operations Troubleshooting Checklist Vii 8 HP Troubleshooting Resources and Tools During Startup Diagnostics Diagnostics Guidelines Online A Problem Customer Advisor, Bulletin, Notifications, and product change notifications product change notifications helpful in startup during operation customer self-repair program troubleshooting scenarios and solutions to hard drives Problem Solving Small Problems Solving Performance Problems Solving Audio Problems Solving Printer Problems Solving Power Supply Problems Solving Power Supply Testing Power Supply Using Power Supply HP PC Hardware Diagnostics (UEFI) HP PC Hardware Diagnostics (UEFI) HP PC Hardware Diagnostics (UEFI) To Download For a USB device diagnostic code and errors diagnostic LED and audible (beep) code LED color definitions post error message password protection and reset CMOS is preparing to configure password clearing password jumper to reset cmos and reset CMOS using CMOS button CMOS Appendix to Reset CMOS Appendix (f10) Utility to Reset a Linux Technical Notes System RAM Audio Network Card Hyper Threading Technology NVIDIA Graphics Workstation amd Graphics Workstation VIII 9 Appendix B Configured RAID Devices To Reset RAID Hard Drive Max and Associated Storage Controller Options Supported RAID Configuration Intel SATA RAID Configuration Configuration System BIOS Confidant Intel Utility Software RAID Solution Software RAID With RAID IDEs Configuration Software RAID Appendix C System Board Designer SFF Workstation System Board Designer Tower Workstation System Board Designers Tower Workstation System Board Designers Index IX 10 x 11 1 1 Hardware Overview This chapter presents an overview of the workstation. Theme Page 2 Ensuring Proper Ventilation on Page 9 on Page 9 on Tower Workstation Components Page 191 12 Current information on components supported accessories and components for small form factor (SFF) workstations for full and current information on small form factor workstation components, Topics on Page 3 Rear Panel Components Page 4 Chassis Components on Page 6 System Board Components Page 6 On System Board Architecture Page 92 Chapter 1 Hardware Overview 13 Front Panel Components 1 Optical Drive 5 Microphone or Headphone Connector (Software Selectable, Default mode is microphone) 2 power button 6 headphone connector 3 hard drive or optical drive activity light 7 optional memory card reader or optional second hard drive 4 USB 3.0 port (2) 8 USB 2.0 port (2) Small Form Factor Workstations Components 3 14 Rear Panel Components Note : Labels for rear panel connectors use industry-standard icons and colors. 1 PS/2 Mouse Connector 8 Power Cord Connector 2 RJ-45 Ethernet Connector 9 PS/2 Keyboard Connector 3 Dual-Mode Displayport (3) 10 USB 2.0 ports (2) 4 cable lock slots 11 serial ports (monitors) 5 USB 2.0 ports (2) 12 USB 3.0 ports (2) 6 padlock loop lock 13 audio line-out connector 7 audio line-in connectors Note: Labels for rear panel connectors use industrystandard icons and colours. Note: DP++ ports are not supported when the system is configured with intel on e3-12x0 v3 processor. In addition, if a discrete graphics card is installed, these ports are disabled by default. 4 Chapter 1 Hardware Overview 15 For complete and current information about accessories and components supported for computers for chassis components, visit the following image indicating the components of a typical SFF computer layout. Drive configurations may vary. 1 Access Panel 6 Optical Drive 2 Power Supply 7 Hard Drive 3 System Board 8 Optional Memory Card Reader or Second Hard Drive 4 Chassis 9 Front Bezel 5 Airflow Guide Small Form Factor Workstation Components 5 16 System Board Components Identify the following illustration and system board components for table SFF workstation. I/O SATA Power 1 Dual-Mode Displayport 16 AHCI 6Gb/s 24 Battery 2 Displayport 23 Processor 3 Front Audio 24 Front Power Button/LED 4 Front Speaker PCI/PCE 25 Main Power 5 Front USB PCE 3 x16 26 Power Com 6 Front USB PCIe2 x4 (1) 27 SATA Power 7 Internal USB PCIe2 x1 Security 8 Internal USB PCIe2 x16 (4) 28 Chassis Solenoid Lock 9 Keyboard/Keyboard Related Detail Card 29 Hood Sensor 10 Network/Rear USB 2.0 Slot Info, Page 60 Service 6 Chapter 1 Hardware Overview 17 11 Parallel (Options) Cooling 30 Clear CMOS Button 12 Rear Audio 21 Processor Fan On Detail Slot See 31 Crisis Recovery Jumper 13 Rear USB 2.0/ME/AMT Flash Override 14 Serial 33 Password Jumper 15 Serial (Option) Small Form Factor Workstation Components 7 18 System Board Architecture The following figure shows the typical system board block diagram. Note: PCE Designer mechanical connectors indicate the size and number of electrical PCE lanes to be routed to the expansion slot. For example, x16 (4) means that the expansion slot is mechanically an x16 length connector, with 4 PCI lanes supported. 8 Chapter 1 Hardware Overview 19 Workstation Specifications SFF Intel Series C226 Chipset: Support for Intel Lin Processor E3 v3 Family, Third generation Intel Core processors up to 95 W, or Intel Pentium processor processor technology power supply memory technology integrated 2-channel memory controller microarciturcher improvement integrated graphics (some models) Advanced Vector Extension (AVX) connect Intel DM12 interface processors to I/O controller 240 W to increase floating point performance. 92% efficient, energy 5.2 requirements compatible with star version 240W, SUPPORTS STD efficient EU ERP Lot 6 Tier 2 power limit less than 0.5W mode dual in-line memory module (DIM) based on DDR Technology supports error checking and correct (ECC) and non-ECC DIMS two direct-attached memory channels enable low latency access and faster data transfer for better performance up to 32 GB system memory (8 GB DIM) 1600 MHz 2, 4, 8 GB Non ECC Supports Unbuffered DIM: Graphics Card PCIe Gen3 (PCIe3) Bus Speed; Dual PCE Gen2 graphics cards in mechanical PCE x16 slot can support multiple graphics cards, provided their total power usage is within 45W up to two displays with integrated Intel HD graphics (depending on processor type), up to six 2D displays or four 3D displays Note: Most supported Intel Core processors offer Intel HD Graphics 4400/4600; Intel Zanian processors with model designations ending in --5 offer Intel HD Graphics P4600. Note: To drive more than three displays, use the Computer Setup (f10) utility to intermix integrated Intel HD graphics and discrete graphics cards (with three or more displays, HP recommends using only discrete graphics cards). RAID configuration 0 for SATA RAID levels, 1 I/O technology an optional adapter can be used with tower workstation components, an optional PCIehead connector tower workstation components to use six external and two internal USB 2.0 ports four external USB 3.0 ports and an internal USB 3.0 port parallel and serial headers, Supports Esata (3.0 Gbps) using the optional PCI bulkhead connector tower workstation components that can be used for current information on supported accessories and computer components. Go to Tower Workstation Components 920 subject front panel component page 11 on rear panel components page 12 chassis components page 12 chassis components on page 6 system board architecture page 8 10 Chapter 1 hardware overview 21 front panel components 1 optical drive 6 on USB. 2.0 (Always-on charging) port (1) 2 second optical drive or optional component 7 USB 2.0 port (1) 3 slim optical drive 8 USB 3.0 port (2) 4 hard drives or optical drives Activity Light 9 Headphone Connector 5 Power Button 10 Microphone Connector Tower Workstation Components 11 22 Rear Panel Components 1 Power Supply Built-in Self Test (BST) LED 9 PS/2 Mouse Connector 2 Power Cord Connector 10 RJ-45 Ethernet Connector 3 PS/2 Keyboard Connector 11 Dual-Mode Displayport (DP++) (2) 4 USB 2.0 Ports (2) 2) 12 Universal Chassis Clamp Opening 5 DVI-I Connector 13 Cable Lock Slot 6 USB 3.0 Port (2) 14 Padlock Loop 7 Microphone Connector 15 USB 2.0 Port (2) 8 Audio Line-Out Connector 16 Audio Line-Connector in Notor : Labels for rear panel connectors use industry-standard icons and colors. Note: DP and DVI-I ports are not supported when the system is configured with intel on e3-12x0 v3 processors. Also, if a discrete graphics card is installed these ports are disabled by default. 12 Chapter 1 Hardware Overview 23 Chassis Component The following figure reflects the chassis components of a typical tower workstation layout. Run May vary. Item Details Item Details 1 Side Access Panel 6 Slim Optical Drive 2 Power Supply 7 Front Bezel 3 Chassis 8 Hard Drive (HDD) 4 Optical Drive 9 Solid-State Drive (SSD) 5 Optional Media Reader or Second Hard Drive 10 System Board Tower Workstation Components 13 24 System Board Components Identify system board components for the following illustration and table tower workstation. I/O SATA Power 1 Dual-Mode Displayport 15 AHCI 6Gb/s 24 Battery 2 Single-Link DVI-I25 Processor 3 Front Audio PCI/PCE 26 Front Power Button/LED 4 Front Speaker 16 PCIe2 x4 (1) 27 Main Power 5 Front USB PCE3 x16 Security 6 Front USB PCIe2 x16 (4) 29 Hood Sensor 14 Chapter 1 Hardware Overview 25 8 Internal USB PCI 32/33 Service 9 Keyboard/Mouse Note: 30 Clear CMOS Button for Related Extension Cards 10 Network/Network Page View Detail Slot on Crisis Recovery Jumper 11 Parallel (Optional) Cooling 32 ME/AMT Flash Override 12 Rear Audio 21 Processor Fan 33 Password Jumper 13 Rear USB 2.0/2.0/2009 Front Fan (Option) 14 Serial (Optional) 23 Rear Fan Tower Workstation Component 15 26 System Board Architecture Note: PCI designers route the mechanical connector size and number of electrical PCE lanes to the expansion slot. For example, x16 (4) means that the expansion slot is mechanically an x16 length connector, with 4 PCI lanes supported. 16 Chapter 1 Hardware Overview 27 Workstation Specifications Tower Intel Series C226 Chipset: Processor Technology Power Supply Memory Technology Support for Intel Excon Processor E3 v3 v3 Family or Third Generation Intel Core Processor 95 W Integrated Up to 2 - Channel Memory Controller Microarciturcher Improvement Integrated Graphics (Some Models) Advanced Vector Extension (AVX) connects Intel DM12 interface processor to I/O controller 400W to increase floating point performance, 92% efficient, Compatible with Energy Star Edition 5.2 Requirements 320W, STD Efficient EU ERP Lot 6 Tier2 Power Limit Supports Less Than 0.5 W Mode Dual In-Line Memory Module (DIMMS) based on DDR3 1600 MHz technology supports error checking and correction (ECC) and non-ECC DIMS two direct-attached memory channels enable low latency access and faster data transfer for better performance up to 32 GB system memory (8 GB DIM) 1600 MHz 2, 4, 8 GB Non ECC Unbuffered DIM supports: Graphics Card PCE Gen3 (PCE3) Bus Speed; Mechanical PCE x16 slots can support dual PCE Gen2 graphics cards in multiple graphics cards, provided their total power usage is within 150 W up to two displays Integrated Intel HD graphics (depending on processor type) up to six 2D displays or four 3D displays Note: Most supported Intel Core processors offer Intel HD Graphics 4400/4600; Intel Zaian with the model designation that, ends in --5, Intel offers hd graphics P4600. Note: To drive more than three displays, use the Computer Setup (f10) utility to intermix integrated Intel HD graphics and discrete graphics cards (with three or more displays, HP recommends using only discrete graphics cards). Raid configuration for SATA RAID Level 0, 1 I/O technology An optional adapter supports Atata (3.0 Gbps) using six external and two internal USB 2.0 ports four external USB 3.0 ports and an internal USB 3.0 port parallel and serial header that can be used with optional PCI bulkhead connector environmental specifications operating temperature: 5 to 35C (40 to 4) Non-operating: -40 to 60 C (-40 to 140 F) Environmental Specifications 17 28 Note: Deriv by a degree C (1.8 degree S F) for every 305 m (1,000 ft) height for altitudes greater than 1,524 m (5,000 ft). Humidity operating height: 8 to 85% relative humidity (RH), non-condensation non-operating: 8 to 90% relative humidity, Non-condensation operations: 0 to 3,048m (10,000 ft) Non-operating: 0 to 9,144m (30,000 ft) Operating: 1/2 - Sign: 40g, 2-3ms (~62cm/sec) Non-operating: Shock 1/2-sine: 160 cm/s, 2-3ms (~105g) Class: 422 cm/s, 20g Note: The price does not represent individual shock events and indicate repetitive shock events. Operating Random: 0.5g(rms), Hz (up to g^2/hz) Vibration Non-operating: Random: 2.0g(rms), Hz (up to g^2/hz) Note: The value does not indicate constant vibration. 18 Chapter 1 Hardware Overview 29 Ensuring proper ventilation is important for workstation operation ensuring proper ventilation for the system. Follow these guidelines: strengthen the workstation, operate on a level surface. Give at least cm (6 inch) clearance in front and back of the workstation. (Workstation models vary.) Make sure that ambient air temperature falls within the environmental specifications listed in this document. Note: The upper limit of the 35C (95F) environment is only good up to 1524 m (5000 ft) height. Above 1524 m (5000 ft) is 1 C (33.8F) per meter (1000 ft) diting. Therefore, at 3,048 m (10,000 ft), the upper ambient air temperature range is 30C (86 F). For cabinet installation, make sure that enough cabinet ventilation and ambient temperature within the cabinet do not exceed the specified range. Never restrict the incoming or outgoing airflow of the workstation by blocking any vents or air intake shown in the following figure. Ensuring proper ventilation 19302 system management This section describes the tools and utilities providing system management for workstations. Theme Power Management and Performance Features on page 20, bios ROM page 22 Computer Setup (f10) Utility Page 23 on desktop management page 36 power management and performance features on ERP compliance mode, this computer provides ERP compliance mode capability. When enabled, Stops for the lowest possible State. The computer will then have to turn on with the power button. One of the effects is that Wake On LAN is disabled. When disabled, computers traditionally powers down. 1. Press f10 during startup. 2. Using the arrow key, select Power > Hardware Power Management > S5 maximum power savings, then choose Enabled. Enabling ERP compliance mode 3. Press f10 to accept the change. 4. Select file > Save Change and Exit, and then enter to accept the change. 5. If using Windows 8 or Windows 8.1, boot Windows and search for settings in the Start menu that power buttons. Change at uncontrolled fast startup (recommended). If the checkbox is not available, select the change settings that are currently unavailable at the top of the window. 1. Press f10 during startup. 2. Using the arrow key, select Power > Hardware Power Management > S5 maximum power savings, then select Disabled. Disabling ERP compliance mode 3. Press f10 to accept the change. 4. Select file > Save Change and Exit, and then enter to accept the change. 5. If using Windows 8 or Windows 8.1, boot Windows and search in the Start menu for settings Change What do the power buttons do. Turn check at fast startup (recommended). If the checkbox is not available, select the change settings that are currently unavailable at the top of the window. 20 Chapter 2 System Management 31 Hyper-Threading Technology (HTT) This computer supports HTT, an Intel-proprietary technology that improves processor performance through parallel to computation (doing multiple tasks at once). The operating system treats an HT ENABLED processor as two virtual processors, and shares the workload between them when possible. This feature requires that the operating system supports multiple processors and is optimized specifically for HTT. Use the Computer Setup (f10) utility to enable HTT. Go to determine if your CPU supports HTT. SATA Power Management SATA Power Management enables or disables SATA bus and/or device power management. Intel Turbo Boost Technology your workstation supports Intel Turbo Boost technology. This feature enables the CPU to run at a higher speed than the normal rate. When not all CPU cores are required for workload, idle cores are turned off and power is diverted to the active core to increase their performance. Turbo Boost is enabled and disabled with the Computer Setup (f10) utility. Go to determine if your CPU supports Turbo Boost. HP Cool Tools (Windows 7 only) HP Workstation and computers running Windows 7 include additional software tools. To learn more about these tools that can enhance the computer experience: 1. HP Cool on desktop Double-click on the icon. 2. To learn more about HP Cool Tools application, click on the Learn more link for the app. 21 32 Non-Uniform Memory Access (NUMA) BIOS ROM ROMs in Power Management and Performance Memory access (NUMA) is available at some workstations. NUMA can improve memory bandwidth and latency for multi-process or multi-thread applications or workloads. Observed performance improvements depend on operating systems, customer workload, system configuration, and degrees which applications used are designed to be NUMA-aware/efficient. NUMA requires that both processor sockets be populated. Installed memory should be balanced between the two processors for maximum performance. NUMA is enabled if the memory node is disabled in interleavy system bios. To do this, press f10 during startup to enter the Computer Setup (f10) utility. Select Advanced > Chipset/Memory. Use arrow keys to set up memory node interleave to disable. Press f10 to exit the menu, and then select File > Save Change and Exit. Your change takes effect when the computer resumes. BIOS ROM is a collection of machine language applications stored as firmware in ROMs. This includes tasks such as power-on self test (POST), PCI device initialization, plug and play support, power management and computer setup (f10) utility. Get to review the latest BIOS ROM specifications. 22 Chapter 2 System Management 33 Computer Setup (f10) utility uses the Computer Setup (f10) utility to do the following: Change factory default settings. Set the date and time of the system. Set, view, change or verify system configurations, including settings for processor, graphics, memory, audio, storage, communication, and input devices. Modify boot orders of bootable devices such as hard drives, optical drives, or USB flash media devices. Enable Quick Boot, which is faster than full boot but does not run all diagnostic tests that run during full boot. You can set up the system: Always enable or disable Quick Boot (default) periodically full boot (every 1 to 30 days) to always enable full boot selection post messages or disable power-on self-test (post) messages to change the performance state. Most post messages disabled suppress messages, such as memory count, product name, and other non-error text messages. If the post error occurs, the error is displayed regardless of the selected mode. To manually switch to posted messages enabled during the post, press any key (except f1 via f12). Install a proprietary tag whose text is displayed each time the system is turned on or restarted. Enter the asset tag or property identification number assigned by the company into this computer. Enable power-on password prompt during system restart (hot shoe) as well as powering. Install a setup password that controls the Computer Setup (f10) utility and access to the settings described in this section. Integrated I/O functionality including serial, USB, or parallel ports, audio, or embedded NICs So that they cannot be used unless they become unsafe. Enable or disable removable media boot System configuration errors detected resolved but not fixed automatically during power-on self-test (POST). Replicate system setup by saving system configuration information on USB devices and restoring it to one or more computers. Perform self-testing on a specified ATA hard drive (when supported by the drive). Enable or disable drivelock protection (when supported by the drive). To start the Computer Setup (f10) utility using the Computer Setup (f10) utility, complete the following steps: Computer Setup (f10) Utility 23 34 1. Turn on or restart the computer. 2. Press f10 repeatedly when the monitor light turns green. Note: If you do not press f10 at the appropriate time, you need to restart the computer and press f10 again when the monitor light is green. 3. The Computer Setup (f10) utility menu shows an option of five titles: file, storage, security, power, and advanced. 4. Use the keys (left and right) to select the appropriate title. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the Computer Setup (f10) utility menu, press ESC. 5. To apply and save changes, select File > Save Changes and Exit. If you've made changes that you don't want to apply, select Ignore Changes and Exits. To reset factory settings or to previously saved default settings (some models), select Default and Exit. This option will restore the original factory system defaults. Note: Not all the settings shown in the following sections are available for caution of all models: Do not turn off computer power while bios computer setup (f10) is saving utility changes as CMOS may be corrupted. It is safe to turn off the computer only after you exit the Computer Setup (f10) utility screen. Heading Table File Computer Setup (f10) Page 25 Storage Computer Setup (f10) Utility Storage Page 25 Security Computer Setup (f10) Utility Computer Setup power on utility security page 28 Advanced Computer Setup/Advanced Page Chapter 2 System Management 35 Computer Setup (f10) on utility file note: Support for specific computer setup (f10) utility option can depend on hardware configuration. Options System Information Details Lists: Product Name Manufacturer SKU Number Processor Type/Speed/Step Memory Size (Channel A, Channel B) Installed memory size/speed, number of channels (single or dual) (if applicable) embedded, enabled NIC (if applicable) Chassis Serial Number Asset Tracking Number System Board System Board Board CT Number System BIOS (Including Family Name, Version, and Date) ME Firmware Version ME Management Mode Displays Fixed Time and Date Flash System ROM Repeated Setup for Copyright Notice. Allows you to set system time and date. You need to update the system ROM with the BIOS image file located on removable media Allows. Save Removable Save A formatted USB flash media saves system configuration for the device. Restore removable media from a USB flash media device from system configuration. Default Setup save current settings because the default default image saves the current system configuration settings as default. Restore factory settings as default Restore factory system configuration settings as default. Apply default and ignore exit changes and exit save changes and exit applies the default settings currently selected and clears any installed passwords. Exits the Computer Setup (f10) utility without applying or saving any changes. Saves changes to system configuration or default settings and exits the Computer Setup (f10) utility. Computer Setup (f10) Utility Storage Note: Support for specific computer setup (f10) utility options may vary depending on hardware configuration. The Computer Setup (f10) utility 25 36 options lists all installed BIOS-controlled storage devices in device configuration details. When a device is selected, detailed information and options are displayed. The following options can be presented: hard drive: size, model, firmware version, serial number, connector color. Translation mode (ATA disk only) lets you select the translation mode used for the device. This enables the BIOS to access partitioned and formatted disks on other systems and may be required for users of older versions of UNIX (e.g., SCO UNIX version 3.2). The options are automatic, bit-shift, LBA assisted, user and off. Only available when drive translation mode is set for the user, allows you to specify the parameters used by Bios (logical cylinder, head and track per area) to translate disk I/O requests (from the operating system or application) into the words of the hard drive. The number of logical cylinders cannot exceed 256. The number of sectors per track cannot exceed 63. Caution: Usually, the translation mode automatically selected by Bios should not be changed. If the selected translation mode is not compatible with translation mode that was active when the disk is split and formatted, the data on the disk will be inaccessible. CD-ROM: model, firmware version, serial number, connector color (not included for USB CD-ROM). SSD Life used the note: displays for solid-state drives. Smart Diskette (ATA disk only): Model and firmware version. Note: Use diskette displays for the drive. See the translation mode above for the default value (ATA disk only) details. SATA default storage option esata port allows you to install a SATA port as an Esata port for use with an external drive. The default is enabled. This setting only affects ports with black connectors , which is labeled as acea on the system board. This port must have an Arata back panel connector that is connected to use the Aceta drive. For more information, see esata white paper on SATA simulation You have to choose how SATA controllers and devices are accessed by the operating system. There are three supported options. Caution: SATA emulation changes can prevent access to existing hard drive data and degrade or corrupt installed volumes. IDE is the most backward-compatible setting of three options. The operating system usually does not require additional driver support in IDE mode. RAID (default option) allows to use DOS and Boot for raid volume. Use this mode with load raid device driver in operating system to take advantage of RAID features. AHCI allows operating systems with load AHCI device drivers to take advantage of the more advanced features of the SATA controller. Note: The RAID/AHCI device driver must be installed before attempting to boot from a RAID/AHCI quantity. If you try to boot from a RAID/AHCI quantity without installing the required device driver, the system will crash (blue screen). The volume of raids can be corrupted if they are removed to after disabling raids. Chapter 2 System Management 26 enables removable media boot/disable the ability to boot the system from removable media. The default is enabled. Max Asata Speed allows you to choose 1.5 Gbps or 3.0 GPB as maximum Esata speed. By default, the speed for maximum reliability is limited to 1.5 Gbps. Caution: Consult your AATA drive and cable manufacturer before enabling 3.0 Gbps speeds. Some drive and cable combinations can not run reliably on 3.0 GPB Boot order allows you: EFI Boot Source: Specify the order in which the EFI boot source (such as internal hard drive, USB hard drive, USB optical drive, or internal optical drive) is checked for a bootable operating system image. Each device in the list can be deleted individually or included for consideration as a bootable operating system source. Specify the command of the attached hard drive. In order the first hard drive will be prioritized in the boot sequence and will be recognized as Drive C (if no tools are attached). A shortcut to the boot order that temporarily overrides the boot order to boot once from a device other than the default device specified in the boot order, restart the computer and restart the ESK (to access the boot menu) and then f9 (boot order), or press f9 (bypassing the boot menu) when the monitor light turns green. After the post is complete, a list of able devices is displayed. Use the arrow key to select the preferred bootable device and press Enter. Shoes shoes from the computer then selected This device for once. Computer Setup (f10) Utility 27 38 Computer Setup (f10) Utility Security Note: Support for specific computer setup (f10) utility options may vary depending on hardware configuration. Option Setup password details allow you to set and enable setup (administrator) passwords. Note: If setup password is set, you need to enter it to change the computer setup (f10) utility options, flash the ROM and make changes to some plug and play settings under Windows. The Power-on Password password option allows you to set and enable power-on passwords. The power-on password prompt appears after the power cycle or reboot. If the user does not enter the correct power-on password, the unit will not boot. Allows you to enable/disable: (This selection appears only when the power-on password or setup password is set. Lock legacy resources (determines whether Windows Device Manager is allowed to change resource settings for serial and parallel ports). Tight security (enabling a hard password disables the ability to reset passwords by moving a jumper to the system board). The default is disabled. Caution: If you enable stringent security feature and you forget setup password or power-on password, the computer is inaccessible and can no longer be used. If you lose or forget the password, the system board should be changed. This scenario is not covered under warranty. To prevent the computer from becoming permanently unusable, record your configured setup password or power-on password in a secure location away from your computer. The computer cannot be unlocked without these passwords. Setup allows you to view the Computer Setup (f10) utility option without entering the Browse mode (if setup password is set) (setup password, but does not change. The default is enabled. Prompt passwords on f9, f11, and f12 (these boot functions require setup passwords to use). The default is enabled. Network server mode. The default is disabled. Smart cover allows you: Lock/unlock the cover lock. Set the cover removal sensor for disabled/notified user/setup password. Note: Notify the user that the cover has been removed that the sensor has detected. Setup password requires that setup password be entered to boot the computer if the sensor detects that the cover has been deleted. Device security allows you to set device available/device hidden (default device available): Embedded security device system system audio USB controller (changes by model) Network controller Note: You must disable AMT before trying to hide the network controller. Parallel port SATA port (varies by model) USB security allows you to set enabled/disabled (default is enabled): Front USB Ports 28 Chapter 2 System Management 39 Rear USB Ports Accessory USB Ports Slot Security Boot system system code allows you to download the Enable/Disable option ROM for each slot. is. Disabling option ROM downloads can help manage limited option ROM space. PCIe frequency limit for Gen1, Gen2, Gen3. Runs slots on gen1, Gen2, or Gen3 instances. Enables/disables the computer S capability to boot from the operating system installed on the network server. (Feature available only on NIC model; network controller must either have a PCI extension card or be embedded on system board.) The default is enabled. Allows you to set: asset tag (18-byte identifier), an asset identification number assigned to the computer by the company. Ownership tag displayed during the post (80-byte identifier). Universal Unique Identity (UUID) number. UUID can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and used to uniquely identify the system.) Keyboard location setting for system ID entry. Master Boot Record Security enables/disables Master Boot Record (MBR) security. MBR contains the necessary information to successfully boot from the disk and access the data stored on the disk. Master boot record protection can prevent unintentional or malicious changes to MBR, such as causing certain viruses or from incorrect use of some disk utilities. This allows you to recover the last known good MBR, changes to MBR should be detected when the system restarts. When MBR security is enabled, Bios prevents any changes being made to the MBR of the current bootable disk while in MS-DOS or Windows Safe mode. Note: Most operating systems control access to mbr of the current bootable disk; Bios cannot prevent changes occurring while the operating system runs. Restores the backup master boot record to the current bootable disk. The default is disabled. Appears only if all the following conditions come true: MBR security has already been saved backup copy of MBR The current bootable disk is the same disk from which the backup copy was carefully saved: restoring the MBR already saved after modifying the MBR by disk utility or operating system, the data on the disk can be inaccessible. If you believe that the current bootable disk MBR has been corrupted or infected with the virus then only restore the already saved MBR. System Security (these options are hardware dependent) data execution prevention (enabled/disabled). The operating system helps prevent security breaches. The default is enabled. SVM CPU virtualization (enabled/disabled). Controls the virtualization features of the processor. To change this setting you need a cap to turn off the computer and then turn it back on. The default is disabled. Virtualization Technology (VTX) (Enabled/Disabled). Controls the virtualization features of the processor. To change this setting you need to the computer and then turn it back on. The default is disabled. Virtualization Technology Guided Guided (VTD) (Enabled/disabled). The virtualization of the chipset controls dma remapping features. To change this setting, you need to turn off the computer and then turn it back on. The default is disabled. Reliable performance technology (enabled/disabled). A virtual device controls the built-in processor and chipset features needed to support. To change this setting, you need to turn off the Computer Setup (f10) Utility 29 40 computer and then turn it back on. The default is disabled. To enable this feature you must enable the following features: Embedded Security Device Support (Virtualization Technology Virtualization Technology Guided I/O Embedded Security Devices (Enabled/Disabled). Embedded security allows activation and inactivity of the device. NOTE: To configure the embedded security device, a setup password must be set. Reset to factory settings (reset/do not reset) Resetting to factory defaults erases all security keys and leaves the device in a disabled state. To change this setting, you need to restart the computer. Do not reset the default. Caution: Embedded security tools are an important component of many security plans. Erasing the security key will prevent access to data protected by embedded security devices. Choosing a reset in factory settings can cause significant data loss. Typically, the computer measures the boot path and saves the collected matrix to PCR5 (a register in the embedded security device) for PCR1. BitLocker makes changes to any of these metrics and forces the user to re-authenticate when detecting any changes. Enabling this feature lets you ignore changes found in boot path metrics to BitLocker, avoiding re-authentication issues associated with the USB key inserted into the port. The default is enabled. System security (issued) OS management of embedded security devices (enabled/disabled). This option allows the user to limit the OS control of the embedded security device. The default is enabled. This option is automatically disabled if reliable execution technology is enabled. Reset of the embedded security device through the OS (enabled/disabled). This option allows the user to limit the operating system capacity to request a reset in the factory settings of the embedded security device. The default is disabled. NOTE: To enable this option, a setup password must be set. No PPI provisioning (Windows 8 only) This option lets you bypass the PPI (Physical Presence Interface) requirement and set Up Windows 8 to enable and take ownership of TPM directly at first boot. You cannot change this setting until the TPM is reset after the TPM is owned/initiated. Default systems other than Windows 8 for disabled, and enabled for Windows 8. Allow PPI policy to be changed by OS. Enabling this option allows the operating system to perform TPM operations without a physical presence interface. The default is disabled. is. To enable this option, a setup password must be set. DriveLock Security allows you to allocate or modify master or user passwords for hard drives. When this feature is enabled, the user is asked to provide one of the drivelock passwords during the post. If neither is successfully accessed, the hard drive will remain inaccessible until one of the passwords is successfully provided during the subsequent cold-boot sequence. Note: This selection will only appear if at least one drive that supports the Drivelock feature is connected to the system. Secure boot configuration legacy support enabled/disabled. Allows you to turn off all legacy support on the computer, including booting dos, running legacy graphics cards, booting legacy devices, etc. If set to Disable, legacy boot options are not displayed in storage > boot orders. The default is enabled. Secure boot enabled/disabled. Allows you to ensure that an operating system is legitimate before booting it, thereby being resistant to malicious modification from Windows Preboot to full OS booting, preventing firmware attacks. UEFI and Windows Secure Boot only allow firmware and code signed by preproed digital certificates during the OS boot process. The default is disabled, except the Windows 8 system in which this setting is enabled. Secure Boot enabled also sets legacy support for the disabled. Main Management This option lets you manage custom key settings. Chapter 30 System Management 41 Clear Secure Boot Keys is not clear/clear. Allows you to delete a previously loaded custom boot key. The default is not clear. Major proprietary HP keys/custom keys. Selecting custom mode allows you to modify the contents of the secure boot signature database and platform key (PK) that confirms kernels during system start-ups, allowing you to use an alternative operating system. The selection of HP Keys causes computer boot using preloaded HP-specific boot keys. The default is HP Keys. Fast boot enabled/disabled. Fast boot disables the ability to disrupt boot, such as pressing the F key to access the item before the operating system loads. The default is disabled. Note: If Windows 8 detects a serious error, it will automatically disrupt the boot process and display advanced boot options. From the Start screen, you can press Shift and select Restart to boot into a device or disturb your computer. Computer Setup (f10) Utility 31 42 Computer Setup Power Note: Support for specific computer setup power options may vary depending on hardware configuration. Option Details OS Power Management Runtime Power Management Enabled/Disabled. The current software does not require the full capabilities of the load processor when the processor does not need anything to reduce voltage and frequency Allows the system. The default is enabled. Passive power savings extended/normal. Allows some operating systems to reduce the power consumption of the processor The processor is useless. The default is increased. ACPI S3 PS2 Mouse Wake Enabled/Disabled: Enables or disables waking up from S3 due to any PS2 mouse activity or a button click. Unique sleep state blink rates enabled/disabled. This feature is designed to provide a visual indication of what sleep state is in the system. Each sleep state has a unique eyelid pattern. The default is disabled. Hardware Power Management Note: For Windows 8 systems with fast boot support, a normal shutdown goes to the S4 state, not the S5 state. S0 (on) solid green LED. 3 naps at S3 (stand by) 1Hz (50% duty cycle) after a pause of 2 seconds. Repeated cycles of 3 naps and a pause (Green LED). S4 (hibernation) 4 naps at 1Hz (50% duty cycle) after a pause of 2 seconds. Repeated cycles of 4 naps and a pause (Green LED). The S5 (soft off) LED is off. SATA Power Management enables or disables SATA bus and/or device power management. The default is enabled. The S5 maximum power savings stops power for all non-essential hardware

when the system is shut down to meet the EUP Lot 6 requirement of less than 0.5 watts of power usage. The default is disabled. PCI Express x16 Slot 1 sets up the active state power management (ASPM) of the bus. ASPM lets you set low power modes that are activated when the bus is not used. The options are Disabilities, LO, L1, LO and L1. The default ASPM is disabled. PCI Express X1 Slot 1 sets up active state power management (ASPM) of the bus. ASPM lets you set low power modes that are activated when the bus is not used. The options are Disabilities, LO, L1, LO and L1. The default ASPM is disabled. The network controller sets the ASPM of the bus. ASPM lets you set low power modes that are activated when the bus is not used. The options are Disabilities, LO, L1, LO and L1. The default ASPM is disabled. The USB 3.0 controller sets the ASPM of the bus. ASPM lets you set low power modes that are activated when the bus is not used. The options are Disabilities, LO, L1, LO and L1. The default ASPM is disabled. Thermal Fan Idle Mode This bar graph controls the minimum allowed fan speed. Note: This setting only changes the minimum fan speed. Fans are still automatically controlled. Chapter 32 System Management 43 Computer Setup Advanced Note: Support for specific computer setup options may vary depending on hardware configuration. Option title Power-on option allows you to set: Post message (enabled/disabled). This feature causes the system to display post error messages, which are error messages displayed on the monitor during the power-on self-test, if Bios encounters some kind of problem when starting the computer. A post error message will be displayed on the screen only if the computer is able to boot up to it. If the post detects an error before this point, a beep code is generated instead. The default is disabled. Press the ESC key for the startup menu (enabled/disabled). this Controls the performance of text presses The key to the startup menu during the post. Neither this text nor any other (for example, ownership tags) is displayed on Windows 8 systems that have fast boot support. Option ROM prompt (enabled/disabled). Because of this feature, the system has to display messages before loading option ROMs. The default is enabled. After power loss (off/on/past state). The default power is off. To set this option: Power off causes the computer to be shut down when power is restored. The computer is automatically turned on as soon as the power is restored. The previous state is due to turn on the computer automatically as power is restored, if it was turned on when power was lost. Note: If you turn off the computer using the switch on the power strip, you won't be able to use the Suspend/Sleep feature or remote management features. Post delay (in seconds). This feature adds user-specified delays to the post process. This delay is sometimes required for hard drives that spin so slowly that they are not ready to boot until the time the post ends. Post Delay also gives you more time to select f10 to enter the Computer Setup (f10) utility. The default is None. Remote wakeup boot source (remote server/local hard drive). The default local hard drive. Factory Recovery Boot Support (Enabled/Disabled). This feature enables the BIOS to redirect the boot to the recovery partition on the user hard drive, if any exists. Some versions of recovery software respect the f11 major press even if this feature is disabled. The default is disabled. Bypass the F1 prompt on configuration changes (enabled/disabled). Allows you to bypass the confirmation step after the changes have been made. The default is enabled. BIOS Power-Onboard Devices This feature enables you to specify a time for the computer to start automatically. Allows you to set or disable resources for legacy tools. Legacy devices of IRQ, DMA, and I/O The settings may not be effective for all operating systems. To hide a device from the operating system, see Device Security & Security. The Bus option allows you to enable or disable: PCI SERR# generation (enable/disable) default is enabled. PCI VGA pallet snooping (enabled/disabled) sets the VGA palette snooping bit in the PCI configuration space; Only needed when more than one graphics controller is installed. The default is disabled. PCI Latency Timer sets pci clock speed. (32/64/96/128/160/192/224/248) | 128 PCI clocks are the default. Device option allows you to set: Turbo mode (enabled/disabled). Allows you to enable and disable the Intel Turbo mode feature, which allows one core of the system to run at more than standard frequency and power if other cores are inactive. The default is enabled. Computer Setup (f10) Utility 33 33

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