

# Service Reference Card

## HP Compaq dc5100 Series Personal Computers

© 2004 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. HP shall not be liable for technical or editorial errors or omissions contained herein. Intel, Pentium, Intel Inside, and the Intel logo are trademarks or registered trademarks of the Intel Corporation and its subsidiaries in the U. S. and other countries.

**Document Number 376223-001.** 1st Edition January 2005

### Key Specifications

Key Specifications	
Processor Type:	Intel Pentium 4 or Intel Celeron
RAM Type:	DDR2 PC3200 non-ECC
Maximum RAM Supported:	Up to 4 GB depending on the model
Expansion Bus:	PCI 2.3, X1 slot
Graphics Adapter	Integrated controller or PCI 2.3 support depending on model
Hard drive interface:	SATA*
I/O Interfaces:	Serial (1 std, 1 optional), parallel (1), USB 2.0 (8), diskette drive (1), audio (5: 2 front, 3 back)

\*You can connect a PATA hard drive. However, HP does not recommend its use .

### System Setup and Boot

Basic system information regarding file, storage, security, and power configuration is maintained in the Setup Utility held in the system ROM. The Setup Utility is accessed by pressing the **F10** key as soon as the computer is turned on. If the screen prompt opportunity is missed, a restart will be necessary.

#### Computer Setup Menu

Heading	Option / Description												
File	System Information - Lists product name, processor type/speed/stepping, cache size, installed memory size/speed, no. channels, integrated MAC for enabled or embedded NIC, system ROM/family name/version, chassis serial number, and asset tracking number.												
	About - Provides copyright information.												
	Set Time and Date - Allows selection of system time and date.												
	Replicated Setup - Allows saving to and restoring from removable media.												
	Default Setup - Allows both saving current settings and restoring factory settings as defaults.												
	Apply Defaults and Exit - Applies currently selected default settings and clears all passwords.												
	Ignore Changes and Exit - Exits Computer Setup without applying or saving any changes.												
	Save Changes and Exit - Saves changes to system configuration and exits Computer Setup.												
Storage	Device Configuration - Lists all installed BIOS storage devices. The following options appear when a device is selected.												
	Diskette Type (legacy diskette drives only) Identifies the highest capacity media type accepted by the diskette drive.												
	Drive Emulation (IDE devices only) Selects drive type emulation for storage												
	<table border="1"> <thead> <tr> <th>Drive Type</th> <th>Emulation Options</th> </tr> </thead> <tbody> <tr> <td>ATAPI Zip Drive</td> <td>None (treated as other), diskette (treated as diskette drive).</td> </tr> <tr> <td>ATA Hard drive</td> <td>None (treated as other), disk (treated as hard drive).</td> </tr> <tr> <td>LegacyDiskette</td> <td>No emulation available.</td> </tr> <tr> <td>IDE CD-ROM</td> <td>No emulation available.</td> </tr> <tr> <td>ATAPI LS-120</td> <td>None (treated as other), diskette.</td> </tr> </tbody> </table>	Drive Type	Emulation Options	ATAPI Zip Drive	None (treated as other), diskette (treated as diskette drive).	ATA Hard drive	None (treated as other), disk (treated as hard drive).	LegacyDiskette	No emulation available.	IDE CD-ROM	No emulation available.	ATAPI LS-120	None (treated as other), diskette.
	Drive Type	Emulation Options											
	ATAPI Zip Drive	None (treated as other), diskette (treated as diskette drive).											
	ATA Hard drive	None (treated as other), disk (treated as hard drive).											
	LegacyDiskette	No emulation available.											
	IDE CD-ROM	No emulation available.											
	ATAPI LS-120	None (treated as other), diskette.											
	<b>Default Values IDE/SATA</b>												
	Multisector Transfers ATA disks only	Selects number of sectors transferred. Options are disabled, 8, and 16.											
	Transfer Mode ATA devices only	Selects active data transfer mode. Options are PIO 0, Max PIO, Enhanced DMA, Ultra DMA 0, and Max UDMA.											
	Translation Mode (ATA disks only) Selects translation mode to enable the BIOS to access disks partitioned and formatted on other systems and may be necessary for users of older versions of Unix. Options are: Automatic, Bit-Shift, LBA Assisted, User, and None. <b>NOTE:</b> The translation mode automatically selected by BIOS should usually not be changed.												
Translation Parameters (ATA disks only) Allows you to specify disk parameters logical cylinders (max. of 1024), heads (max. of 256), and sectors per track (max. of 63) used by BIOS to translate disk I/O requests. Fields are visible and changeable only when drive translation mode is set to User.													
Storage Options	Removable Media Boot. Enables/disables ability to boot system from removable media.												
	Legacy Diskette Write. Enables/disables ability to write data to legacy diskettes.												
	BIOS DMA Data Transfers. Controls the type of data transfer used by the BIOS to fulfill read and write requests. DMA is used when Enable is selected. PIO is used when Disable is selected.												
	SATA Emulation. Specifies whether the SATA and PATA controllers function as two separate or one combined controller. Separate IDE Controller emulation is recommended for Windows 2000 and XP. Combined IDE Controller emulation is recommended for operating systems that only support one IDE controller.												

#### Computer Setup Menu (Continued)

Heading	Option / Description
Storage (continued)	Storage Options (ctd)
	Primary SATA Controller - Enable/disable.
	Secondary SATA Controller - Enable/disable.
	DPS Self-Test - Allows execution of the Drive Protection System (DPS) tests on ATA hard drives capable of the SMART self-tests.
	Boot Order - Specifies the prioritized order of potential boot devices. Each entry may be included or excluded from consideration as a boot source. Use <b>F9</b> during POST to select a one-time override to the boot order specified here.
Security	Setup Password - Enable/disable setup (administrator) password.
	Power-On Password - Enable/disable power-on password.
	Password Options (appears if Power-On or Setup password is set) - Enable/disable password for warm boot.
	Smart Cover Lock (some models) - Enable/disable Smart Cover Lock.
	Embedded Security - Enable/disable Embedded Security device. Reset device to Factory Settings.
	Device Security - Enable/disable serial/parallel/USB ports, system audio, NIC (some models).
	Network Service Boot - Enables/disables Network Service Boot.
	System IDs - Allows setting of Asset and Ownership Tags, chassis serial number, keyboard locale, and Universal Unique Identifier (UUID).
	DriveLock - Allows assignment of master or user password for Multi-Bay hard drive(s).
	Data Execution Prevention - Enable/disable to prevent OS Security breaches.
	Master Boot Record (MBR) Security - Enable/disable BIOS MBR change reporting and write-protection.
	Save MBR - Saves backup copy of MBR of current bootable disk.
Restore MBR - Restores MBR to current bootable disk.	
Power	OS Power Management - Enable/disable processor voltage and frequency reduction during run and idle times; ACPI S3 support.
	Hardware Power Management - Enable/disable SATA bus and/or device power management.
	Thermal - Fan idle mode to control minimum fan speed.
Advanced (advanced users only)	Power-On Options - Select POST mode for QuickBoot, FullBoot, Full-Boot every 1-30 days; Enable/disable POST messages; Enable/disable option ROM prompt; Enable/disable I/O APIC mode; Select computer state after power loss; Select wakeup boot source; Enable/disable POST delay (for slow hard drives); Enable/disable ACPI/USB buffers; Enable/disable NIC option ROM download; Enable/disable Hyper-threading.
	BIOS Power-On - Set computer to turn on at specific time of day.
	Onboard Devices - Set resources for onboard devices (serial/parallel port or diskette controller).
	PCI Devices - Lists currently installed PCI devices and IRQ settings. Allows configuration/disabling of devices (no effect on APIC systems)
	Bus Options - Enable/disable PCI bus mastering, PCI VGA palette snooping, PCI SERR# function, and ECC on select systems.
	Device Options - Set printer mode (bidirectional output only); Num Lock State; Wake-up events; processor cache; unique sleep state blink patterns; integrated video; monitor tracking; NIC PXE Option ROM download.
	PCI VGA Configuration - Allows selection of VGA controller (if multiple PCI video controllers are installed).

#### Failsafe Boot Block ROM

The computer comes with a reprogrammable flash system ROM (read only memory).

**NOTE:** No USB device of any type will function during bootblock recovery.

To upgrade the ROM, you may:

a. Order an upgraded ROMPaq diskette from HP.

or

b. Download the latest ROMPaq images from the HP Web site ([www.hp.com](http://www.hp.com)). All ROM images used with HPQFlash and SSM are digitally signed to ensure authenticity and minimize potential corruption. Your system ROM includes a Failsafe Boot Block that is protected during the flash process and allows the computer to be restarted in the unlikely event of an unsuccessful ROM flash.

If the system detects an invalid system ROM during the boot sequence the system will sound one long and three short beeps, flash the three keyboard LEDs twice, and display a recovery mode message on the screen. To recover from the Boot Block recovery mode complete the following steps:

1. Remove any diskettes from the diskette drive and turn off power.
2. Insert a ROMPaq diskette into the diskette drive or a bootable CD-ROM into an IDE CD-ROM drive. (Bootable ISO CDs are available on the Web at [www.hp.com](http://www.hp.com).)
3. Turn on power to the system.
4. If a Setup password has been established, the Caps Lock LED will come on to prompt you for the password. Enter the password.
5. A successful boot and ROM flashing (reprogramming) with a ROMPaq diskette is indicated by the three keyboard LEDs turning on and a series of beeps rising in tone.

#### Security Functions

The system offers independent Power-On and Setup passwords for system and data protection. The Power-On password protects the computer from unauthorized access by prompting the user for a password during power up. The Setup password protects the computer from unauthorized or inadvertent reconfiguration of legacy device resource settings or ROM flash upgrade by prompting the user for a password prior to entering the Setup Utility.

To establish a password:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the computer.**
2. As soon as the computer is turned on, press and hold **F10** until you enter Computer Setup. Press **Enter** to bypass the title screen, if necessary. If you do not press **F10** as soon as the computer starts, a restart will be necessary.
3. Select Security, then select Setup Password or Power-On Password and follow the instructions on the screen.
4. Before exiting, click **File > Save Changes and Exit.**

## Security Functions (Continued)

To change a Power-On or Setup password:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the Computer**. Run Computer Setup (F10).

When the key icon appears, type your current password, a slash (/) or alternate delimiter character, your new password, another slash (/) or alternate delimiter character, and your new password again as shown:  
current password/new password/new password.

**NOTE:** Type the new password carefully since the actual characters do not appear on the screen.

2. Press **Enter**.

The new password will take effect the next time the computer is restarted.

To delete a password using Setup:

1. Turn on or restart the computer. If you are in Windows, click **Start > Shut Down > Restart the Computer**. To delete the setup password, run Computer Setup (F10).
2. When the key icon appears, type your current password followed by a slash (/) or alternate delimiter character as shown. Example: currentpassword/
3. Press **Enter**.

To delete or disable the Power On and Setup passwords:

1. Shut down (Power down) the system and disconnect the power cord from the outlet or the system unit.
2. Remove the chassis cover.
3. On the system board, remove the jumper on pins 1 and 2 of header E49 and place only on pin 2.
4. Replace the chassis cover and reconnect the power cord.

**NOTE:** Setup password may be used in place of Power-on password to boot system.

### Security Features

Feature	Purpose	How It Is Established
Removable Media Boot Control	Prevents booting from removable media drives.	Setup Utilities. [1]
Serial, Parallel, USB, or Infrared Interface Control	Prevents data transfer through integrated serial, parallel, USB, or infrared interface.	Setup Utilities. [1]
Power-On Password	Prevents use of computer until password is entered. Can apply to both initial startup and restart.	Setup Utilities. [1]
Setup Password	Prevents reconfiguration of computer until password is entered.	Setup Utilities. [1]
Network Server Mode	Provides unique security features for computer used as server.	Setup Utilities. [1]
DriveLock	Prevents unauthorized access to data on drives supporting password protection.	Setup Utilities. [1]
Smart Cover Lock [2][3]	Software-controllable solenoid that, when activated, prevents unauthorized access to chassis interior.	Setup Utilities. [1]
Smart Cover Sensor [3]	Indicates computer cover or side panel has been removed. Can be set to require password for restart after cover or panel removal.	Setup Utilities. [1]
Master Boot Record (MBR) Security	May prevent unintentional or malicious changes to MBR of the current bootable disk and provides a means of recovering "last known" MBR image.	Setup Utilities. [1]
Drive Protection System (DPS)	Diagnostic tool built into hard drives on select models designed to discover problems that might result in unwarranted drive replacement.	Setup Utilities or Diagnostics for Windows.
Memory Change Alerts	Detects addition or removal of memory modules. Notifies system administrator.	Refer to Intelligent Manageability Guide.
Ownership Tag	Displays ownership information as defined by system administrator during system startup. (Protected by setup password).	Setup Utilities. [1]
Kensington CableLock Provision	Inhibits access to interior of computer chassis. Can also be used to secure computer to a fixed object for prevent theft.	Requires Kensington cable lock accessory to secure computer to a fixed object.

**NOTES:**

- [1] For more information about Setup Utilities refer to the Computer Setup Guide.
- [2] If for any reason the Setup utility is not accessible to unlock the Smart Cover Lock then a FailSafe key is required to bypass the Smart Cover Lock and open the computer. Refer to the Hardware Reference Guide on how to use the FailSafe key. To order a Fail-Safe key contact HP.
- [3] Available on some models.

## Diagnostic Functions

Diagnostic functions are provided by the Setup Utility (in system ROM) and by Diagnostics for Windows. Diagnostics for Windows provides detailed system information including:

- Processor type and speed
- Memory amount, mapping, and integrity
- Hardware peripheral availability/settings
- Hard drive type, space used/available
- System identification, asset tracking

Diagnostics for Windows may be pre installed on some models and can be downloaded free of charge from [www.hp.com](http://www.hp.com).

## Error Conditions and Messages

### PS/2 Keyboard LED Indications

NUM lock LED	Caps Lock LED	Scroll Lock LED	Event
On	Off	Off	ROMPaq diskette not present, faulty, or drive problem
Off	On	Off	Password prompt
Blinking [1]	Blinking [1]	Blinking [1]	Invalid ROM and/or flash failed
Blinking [1]	Blinking [2]	Blinking [2]	Keyboard locked in network mode
On [3]	On [3]	On [3]	Successful ROM flash

**NOTES:**

- [1] All LEDs will blink in sync twice, accompanied by 1 long and 3 short beeps
- [2] LEDs will blink in sequence (NUM, Caps, then Scroll Lock)
- [3] Accompanied by rising beep tone

### Chassis LED and Beep Messages

Power LED	# Beeps	Event
Steady green	None	S0 System on (normal operation)
Blinks green @ 0.5 Hz	None	S1 Suspend
Blinks green @ 0.5 Hz	None	S3 Suspend to RAM
Off (clear)	None	S4 Suspend to disk
Off (clear)	None	S5 Soft off
Blinks red 2 times @ 1 Hz [1]	2	Processor thermal shutdown
Blinks red 3 times @ 1 Hz [1]	3	Processor not seated / installed
Blinks red 4 times @ 1 Hz [1]	4	Power supply failure
Blinks red 5 times @ 1 Hz [1]	5	Memory error
Blinks red 6 times @ 1 Hz [1]	6	Video error
Blinks red 7 times @ 1 Hz [1]	7	PCA failure
Blinks red 8 times @ 1 Hz [1]	8	Invalid ROM checksum (error)
Blinks red 9 times @ 1 Hz [1]	9	Wrong power supply input voltage
Blinks red 10 times @ 1 Hz [1]	10	Bad option card

**NOTE:**

- [1] Power LED blinks are repeated after a 2 second pause until issue is resolved. Beeps continue for 5 iterations and then stop.

### Common POST Error Messages

Screen Message	Beeps	Probable Cause	Recommended Action
101-Option ROM Error	1L, 1S	1. System ROM checksum error. 2. Expansion card. 3. CMOS corruption. 4. System board	1. Verify ROM, reflash if required. 2. Remove suspected expansion card, reboot. 3. Clear CMOS memory, reboot. 4. Replace system board.
102-System Board Failure	none	DMA, timers	1. Clear CMOS memory. 2. Remove expansion boards. 3. Replace system board.
164-Memory Size Error	2S	Incorrect memory configuration.	1. Run Setup (F10). 2. Check DIMMs for proper seating, proper type, and HP compatibility. 3. Remove DIMMs singularly and reboot to isolate faulty DIMM.
201-Memory Error	none	RAM failure	Same as 164.
301-, 304-Keyboard Error	none	Keyboard failure.	Check keyboard connection or keys. Replace keyboard. If 304, possible system board problem
501-Display Adapter Failure	1L, 2S	Graphics controller.	1. Reseat graphics card. 2. Check monitor connection. 3. Replace graphics card.
602-Diskette Boot Error	none	Diskette in drive A not bootable	Remove/replace diskette.
1720-SMART Hard Drive Detects Imminent Failure	none	Hard drive is about to fail.	Run drive protection system test if available. Check for firmware patch for erroneous error message.

**NOTES:** L = long, S = short