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**Subject: Statement of Volatility – Dell Precision 5820/7820/7920 Tower**

The Dell Precision 5820/7820/7920 Tower contains both volatile and non-volatile (NV) components. Volatile components lose their data immediately upon removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component.

The following memory components are present in the 5820/7820/7920 Tower:

#### **BIOS Configuration**

The BIOS information is stored in one flash IC, 32 MByte. This device is identified as SPI\_1 on the motherboard. This part contains the boot code and data necessary to take the hardware from a power-off or low-power state to a state where it is ready to be managed by the operating system. No information pertaining to user applications or data is stored in this device, however, they do store administrator and/or hard drive encryption passwords if those features are enabled by the user.

#### **Embedded Controller**

The Embedded Controller contains a 4 Mbit of SPI flash IC and is identified as SPI\_2 on the motherboard. The EC contains the software necessary to manage low-level control functions on the motherboard such as thermal control. No information pertaining to user applications or data is stored in the SPI\_2 device.

The embedded controller also contains 320 kBytes of volatile memory space and 128 Bytes of RTC backed SRAM. The contents of this memory space are lost when power is removed from the system.

#### **PCH CMOS**

The PCH, identified as US1H, contains a 256 Byte battery-backed memory. This memory contains custom configuration data required by the BIOS to boot the system. It does not store passwords or other user level data. The contents of this space are lost, after several minutes, if the coin-cell battery is removed from the motherboard.

#### **TPM (Trusted Platform Module) Security Device**

This device (identified as UF1) stores TPM configuration data used by the hardware and the security software offered by Dell. Encrypted user keys generated by the TPM device for use by the security software are stored in this NVM.

#### **CPLD**

The CPLD IC is a factory-programmed Logic Device that incorporates various low-level hardware logic functions into a single device. It is in location UO1 on the 7920 Tower, and CPLD0 on the 7820 and 5820 Tower motherboard. No information pertaining to user applications or data is stored on the CPLD. The CPLD contains 90 kBytes of flash memory; however, this memory is left blank initially and is only used for debug information. The CPLD can be reprogrammed during BIOS flash update. The BIOS flash update is not capable of writing to this location.

The following memory components are present in the 7920 Tower only:

#### 1. Ethernet Controller EEPROM

The Ethernet Controller EEPROM is identified as UL3 on the motherboard. It is a 32 Mbit device. The Ethernet Controller EEPROM stores driver information and the system MAC addresses. It does not store password, IP address, domain name, system ID, or similar information.

All other components on the motherboard will lose data once power is removed from the system. Primary power loss (unplug the power cord) will destroy all user data in the main system memory (DDR4 DIMMs) and the on-board graphics and storage interface devices. **However**, the user should note that under some circumstances (for example, cold temperatures) the DDR4 DIMMs may retain their data for a significant amount of time – up to several minutes. That may potentially allow the DIMMs to be removed from one system and installed in another without loss of the data contained in them.

Secondary power loss (removing the on board coin-cell battery) will destroy system data in the PCH (platform controller hub), including time-of-day information.

There are other volatile and non-volatile components on the devices or peripherals attached to the motherboard:

The Video Card contains volatile and non-volatile memory components. The volatile frame buffer memory will lose data once power is removed. The non-volatile memory (Video BIOS) stores only video card setup information. The video BIOS is not accessible by the user.

The CD-RW/Diskette Drives/DVD-R/W/Blu Ray DVD-R/W are input/output devices, whereas the DVD-ROM is an input device only. All data is processed through cache (volatile) memory. Any associated internal NVRAM is factory programmed, does not contain any user data, and is not accessible by the user.

The SAS and/or SATA Hard Drives and optional storage controller cards store non-volatile data. All data is processed through cache (volatile) memory. Any associated internal NVRAM is factory programmed, does not contain any user data, and is not accessible by the user. These devices may be removed.

The Monitor may retain “Burn-In” images after long periods of displaying static data. If any burn-in images exist, they can readily be seen using simple procedures. NV memory components are used for storing monitor calibration/configuration data & are not accessible by the user.

The DIMMs in the system do contain a small EEPROM that is used for memory identification purposes and for error logging. It does not contain any user data and is not accessible by the customer.

The Voltage Regulators in the system contain a small FW space for power up parameters. It does not contain any user data and is not accessible by the customer.

The CPU Riser for the 7820 Tower and the High Speed Backplanes do contain a small CPLD for power up and device management. They do not contain any user data and are not accessible by the customer.

To help clarify memory volatility and data retention in situations where the system is put in different ACPI power states, the following information is provided regarding ACPI power states S0, S1, S3, S4 and S5:

- S0 state is the working state where the dynamic RAM is maintained and is read/write by the processor.
- S1 state is a low wake-up latency sleeping state. In this state, no system context is lost (CPU or chip set) and hardware maintains all system contexts.
- S3 is called “suspend to RAM” state or stand-by mode. In this state the dynamic RAM is maintained. Dell systems will be able to go to S3 if the OS and the peripherals used in the system supports S3 state. Windows XP, Windows Vista and Windows 7 all support S3 state.
- S4 is called “suspend to disk” state or “hibernate” mode. There is no power. In this state, the dynamic RAM is not maintained. If the system has been commanded to enter S4, the OS will write the system context to a non-volatile storage file and leave appropriate context markers. When the system is coming back to the working state, a restore file from the non-volatile storage can occur. The restore file has to be valid. Dell systems will be able to go to S4 if the OS and the peripherals support S4 state. Windows 7 and Windows 8.1 support S4 state.
- S5 is the “soft” off state. There is no power. The OS does not save any context to wake up the system. No data will remain in any component on the system board, i.e. cache or memory. The system will require a complete boot when awakened. Since S5 is the shut off state, coming out of S5 requires power on which clears all registers.

The Dell Precision 5820/7820/7920 Tower supports all of the above states, except S1.

Please direct any questions to the undersigned

Very truly yours;

Dell Marketing L.P.