Dell Inc.
One Dell Way
Round Rock, Texas 78682

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Subject: Statement of Volatility – Dell Precision Workstation T3500

Madam/Sirs:

The Dell Precision Workstation T3500 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 NV components are present on the T3500 motherboard:

BIOS Configuration
The BIOS software is stored in a 16 Mbit flash IC, which is identified as U_BIOS on the motherboard. U_BIOS 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 the U_BIOS device, however, it does store administrator and/or hard drive encryption passwords if those features are enabled by the user.

ICH CMOS
The ICH, identified as U_ICH, 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 memory are not lost when AC power is removed from the system. The data in this memory can be cleared by installing the RTCRST jumper or by removing the coin cell BATTERY, with AC power removed.

Embedded Controller
The Embedded Controller contains 192 kByte of non-volatile storage space and is identified as U_EC 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 U_EC device.

The embedded controller also contains 16 kBytes of volatile memory space. The contents of this memory space are lost when AC power is removed from the system.

Fan Controller
The Fan Controller, U_HWM, is a factory-programmed device that monitors and controls the various fans needed for proper thermal operation. This device contains 32k bytes of ROM. The data inside the ROM is not accessible to the user. No information pertaining to user applications or data is stored in the Fan Controller.

CPLD

The CPLD IC, U_CPLD, is a programmable logic device that incorporates various low-level hardware logic functions into a single component. No information pertaining to user applications or data is stored on the CPLD. The CPLD contains 8 kBytes of flash memory; however, this memory is left blank and is not used in the T3500. The CPLD can be reprogrammed via a special software program provided by Dell. The special program is not capable of updating the 8 kByte flash memory.

Ethernet Controller EEPROM

The Ethernet Controller EEPROM is identified as U_LOMEE on the motherboard. It is an 8 Mbit device. The Ethernet Controller EEPROM stores driver information and the system MAC address. It does NOT store password, IP address, domain name, system ID, or similar information.

TPM 1.2 (Trusted Platform Module) Security Device

This device, U_TPM, stores TPM configuration data used by the hardware and the WAVE Embassy Suite Security (ESS) software. Encrypted user keys generated by the TPM device for use by the WAVE ESS software are stored in this non-volatile memory device.

Super I/O Controller

The Super I/O Controller (SIO_IC) provides the legacy I/O components, power management glue logic, and the Fan Controller. The fan controller device monitors and controls the various fans needed for proper thermal operation. It contains 2K bytes of ROM for the microcode that handles the fan controller function. The data inside the ROM is not accessible to the user. No information pertaining to user applications or data is stored in the SIO.

All other components on the motherboard will lose data once power is removed from the system. Primary power loss (unplug the AC power cord) will destroy all user data in the main system memory (DDR3 DIMMS) and the add-in graphics, and storage interface devices. **However**, the user should note that under some circumstances (for example, cold temperatures) the DDR3 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 battery) will destroy system data on the SIO (super IO), ICH (I/O controller hub), and the time of the day information.

There are other volatile and non-volatile components, devices or peripherals, which can be 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, and DVD-R/W drives are input/output devices, whereas the DVD/CD-ROM is an input device only. All data is processed through volatile cache 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 volatile cache 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 from the system.

The Monitor may retain "Burn-In" images after long periods of displaying static data. If a burn-in image exists, it can readily be seen using the well-established Black Light procedure. NV memory components in the Monitor are used for storing monitor calibration/configuration data and are not accessible by the user.

In addition, the following information is provided regarding the different system-level ACPI power states (S0, S1, S3, S4 and S5) with regards to memory volatility and data retention:

- S0 state is the system 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 the "suspend-to-RAM" state, "stand-by" or "sleep" mode. In this state data in the dynamic RAM is maintained. Dell systems are able to go into S3 if the OS and the peripherals used in the system support the S3 state. Win98 SE, Win 2K, Win XP and Windows Vista support the S3 state.
- S4 is called "suspend-to-disk" state or "hibernate" mode. In this state, the main motherboard power rails are turned-off; the standby power rail is on. The data in dynamic RAM is not maintained. When the system is commanded to enter S4, the OS will write the system context to a non-volatile storage file on the hard-disk-drive and appropriate context markers. When the system is restored to the working state, a restore file from the non-volatile storage can occur. The restore file has to be valid. Dell systems are able to go into S4 if the OS and the peripherals used in the system support the S4 state. Win98 SE, Win2K, Win XP and Windows Vista support the S4 state.
- S5 is the "soft" off state. In this state, the main motherboard power rails are turned-off; the standby power rail is on. The OS does not save any system context. No data will remain in any volatile memory component on the system board, i.e. cache or main 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 Precision workstation T3500 supports all of the above states.

Please direct any questions to the undersigned

Very truly yours;
Dell Marketing L.P.