



Statement of Volatility – Dell EMC PowerEdge R640

The Dell EMC PowerEdge R640 contain both volatile and non-volatile (NV) components. Volatile components lose their data after removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component. Configuration option information (pertinent to options such as microprocessors, remote access controllers, and storage controllers) is available by component separately. The following components are present in the PowerEdge R640 servers.

Item	Non-Volatile or Volatile	Quantity	Reference Designator	Size	Type	Can user programs or operating system write data during normal operation?	Purpose	How is data added to the memory?	How is the memory write protected?	How is the memory cleared?
Planar										
PCH Internal CMOS RAM	Non-Volatile	1	U_PCH	256 Bytes	Battery-backed CMOS RAM	No	Real-time clock and BIOS configuration settings	BIOS	N/A – BIOS only control	<ol style="list-style-type: none"> 1) Set NVRAM_CLR jumper to clear BIOS configuration settings at boot and reboot system. 2) Power off the system, remove coin cell battery for 30 seconds, replace battery and then power back on. 3) Restore default configuration in F2 system setup menu.
BIOS Password	Non-Volatile	1	U_PCH	16 bytes	Battery-backed CMOS RAM	Yes	Password to change BIOS settings	Keyboard	N/A	<ol style="list-style-type: none"> 1) Place shunt on J_PSWD_NVRAM jumper pins 2 and 4. 2) AC power off is required after placing the shunt. 3) AC power on with the shunt in place and then can be removed.

BIOS SPI Flash	Non-Volatile	1	U212(PRIM_SPI_BIOS)	32 MB	SPI Flash	No	Boot code, system configuration information, UEFI environment, Flash descriptor, ME	SPI interface via PCH	Software write protected	Not possible with any utilities or applications and system is not functional if corrupted or removed.
BIOS Recovery SPI Flash	Non-Volatile	1	U218	16MB	SPI Flash	No	16MB Recovery SPI ROM exits as an aid to reprogram the primary ROM	SPI interface via PCH	Software write protected	Not possible with any utilities or applications and the system is not functional if BIOS SPI is corrupted or removed.
iDRAC SPI Flash	Non-Volatile	1	U217(UBOOT)	4 MB	SPI Flash	No	iDRAC Uboot (bootloader), server management persistent store (i.e. iDRAC MAC Address, iDRAC boot variables), lifecycle log cache, virtual planar FRU and EPPID, rac log, system event log, JobStore, iDRAC Secure boot code,	SPI interface via iDRAC	Embedded iDRAC subsystem firmware actively controls sub area based write protection as needed.	The user cannot clear memory completely. However, user data, lifecycle log and archive, SEL, and fw image repository can be cleared using Delete Configuration and Retire System, which can be accessed through the Lifecycle Controller interface.

BMC EMMC	Non-Volatile	1	U_EMMC1	8 GB	eMMC NAND Flash	No	Operational iDRAC FW, Lifecycle Controller (LC) USC partition, LC service diagnostics, LC OS drivers, USC firmware	NAND Flash interface via iDRAC	Embedded FW write protected	The user cannot clear memory completely. However, user data, lifecycle log and archive, SEL, and fw image repository can be cleared using Delete Configuration and Retire System, which can be accessed through the Lifecycle Controller interface.
CPU Vcore Regulators	Non-Volatile	2	U40, U48	16 KB	ROM	No	Operational parameters	Programmed at factory via I2C	No write protect	The user cannot clear memory.
CPU Vmem Regulators	Non-Volatile	2	U61, U69	16 KB	ROM	No	Operational parameters	Programmed at factory via I2C	no write protect	The user cannot clear memory.
System CPLD RAM	Volatile	1	U_CPLD1	1 KB	RAM	No	Not utilized	Not utilized	Not accessible	Not accessible
System CPLD FLASH	Non-Volatile	1	U_CPLD1	256Kb	RAM	No	Power on System Firmware	Firmware update	BIOS Security Protocols	The user cannot clear memory.
System Memory: RDIMM and LRDIMM	Volatile	Up to 12 per CPU	CPU<2:1>_CH<5:0>_D<1:0>	Up to 32GB per DIMM	DRAM	Yes	System OS RAM	System OS	OS Control	Reboot or power down system
System Memory: NVDIMM-N	Non-Volatile	Up to 6 per CPUs 1 and 2 (12 total in system)	CPU<2:1>_CH<5:0>_D1	16GB per NVDIMM-N	Flash – NVDIMM	No	Data integrity	When system initiates a Save (AC loss, shutdown, etc.), NVDIMM-N controller will transfer data from DRAM to Flash	Neither system nor OS can access the flash, only a system initiated Save will trigger the NVDIMM-N controller to transfer data from DRAM to flash	Using BIOS menu option, select NVDIMM factory reset

Internal USB Key	Non-Volatile	Up to 1	J_USB_INT	Varies (not factory installed)	Flash	Yes	General purpose USB key drive	USB interface via PCH. Accessed via system OS	No write protect	Can be cleared in the system OS
Trusted Platform Module (TPM, TPM 2.0 only)	Non-Volatile	1	U_TPM	128 Bytes	EEPROM	Yes	Storage of encryption keys	Using TPM Enabled operating systems	SW write protected	F2 Setup option
CPU	Volatile	1 or 2	CPU1 / CPU2	Various	Cache + registers	Yes	Processor cache + registers	Various	Various	Power off
iDRAC DDR	Volatile	1	U_IDRAC9_DRAM1	256M Byte	DRAM	No	iDRAC local memory	iDRAC Firmware	NA	Power off
iDRAC	Volatile	1	U_IDRAC	64 kbyte + registers	Cache + registers	No	Processor cache + registers	iDRAC Firmware	NA	Power off
PIROM	Non-Volatile	1 or 2	CPU1 / CPU2	256 Bytes	EEPROM	no	Processor info + scratchpad	SMBus interface to iDRAC	128 bytes protected by Intel/128 bytes not protected	The user cannot clear memory.
2x2.5" rear Backplane										
SEP internal flash	Non-Volatile	1	U_SEP	64K Bytes	Flash	No	FW configuration data	Pre-programmed before assembly	Not WP	The user cannot clear memory.
SEP internal EEPROM	Non-Volatile	1	U_SEP	2K Bytes	EEPROM	No	FRU	Programmed at ICT during production.	Not WP	The user cannot clear memory.
4x3.5" Backplane										
SEP internal flash	Non-Volatile	1	U_SEP	32K Bytes	Flash	No	FW configuration data	Pre-programmed before assembly	Not WP	The user cannot clear memory.

SEP internal EEPROM	Non-Volatile	1	U_SEP	2K Bytes	EEPROM	No	FRU	Programmed at ICT during production.	Not WP	The user cannot clear memory.
8x2.5" Backplane										
SEP internal flash	Non-Volatile	1	U_SEP	32K Bytes	Flash	No	FW configuration data	Pre-programmed before assembly	Not WP	The user cannot clear memory.
SEP internal EEPROM	Non-Volatile	1	U_SEP	2K Bytes	EEPROM	No	FRU	Programmed at ICT during production.	Not WP	The user cannot clear memory.
10x2.5" EXP/Backplane										
NVSRAM memory	Non-Volatile	1	U3	1 Mb	MRAM	No	Configuration data	ROC writes configuration data to NVSRAM	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
Flash memory	Non-Volatile	1	U2	128 Mb	Flash	No	Card firmware	Pre-programmed before assembly. Can be updated using Dell/LSI tools	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
BP FRU image	Non-Volatile	1	U14	2Kb	EEPROM	No	FRU	Programmed at ICT during production.	Not WP	The user cannot clear memory.
Expander FRU image	Non-Volatile	1	U5	2Kb	EEPROM	No	FRU	Programmed at ICT during production.	Not WP	The user cannot clear memory.
H730, H830 PERCs										
NVSRAM	Non-volatile	1	U1033	128KB	NVSRAM	No	Configuration data	ROC writes configuration data to NVSRAM	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer


FRU	Non-volatile	1	U1019	256B	FRU	No	Card manufacturing information	Programmed at ICT during production.	Not WP	Cannot be cleared with existing tools available to the customer
1-Wire EEPROM	Non-volatile	1	U1004	128B	1-Wire EEPROM	No	Holds default controller properties/settings	ROC writes data to this memory	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
SPD	Non-volatile	1	U22	256B	SPD	No	Memory configuration data	Pre-programmed before assembly	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
SBR	Non-volatile	1	U1020	8KB	SBR	No	Bootloader	Pre-programmed before assembly	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
Flash	Non-volatile	1	U1031	16MB	Flash	No	Card firmware	Pre-programmed before assembly. Can be updated using Dell/LSI tools	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
ONFI Backup Flash	Non-volatile	1	U1059	4GB	ONFI Backup Flash	No	Holds cache data during power loss	FPGA backs up DDR data to this device in case of a power failure	Not WP. Not visible to Host Processor	Flash can be cleared by powering up the card and allowing the controller to flush the contents to VD's. If the VD's are no longer available, cache can be cleared by going into controller BIOS and selecting Discard Preserved Cache.
SDRAM	Volatile	5	U1043-U1047	512MB/1GB	SDRAM	No	Cache for HDD I/O	ROC writes to this memory - using it as cache for data IO to HDDs	Not WP. Not visible to Host Processor	Cache can be cleared by powering off the card
H330, H330M PERC										
NVSRAM	Non-volatile	1	U1033	128KB	NVSRAM	No	Configuration data	ROC writes configuration data to NVSRAM	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer

FRU	Non-volatile	1	U1019	256B	FRU	No	Card manufacturing information	Programmed at ICT during production	Not WP	Cannot be cleared with existing tools available to the customer
1-Wire EEPROM	Non-volatile	1	U1004	128B	1-Wire EEPROM	No	Holds default controller properties/settings	ROC writes data to this memory	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
SBR	Non-volatile	1	U1020	8KB	SBR	No	Bootloader	Pre-programmed before assembly	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
Flash	Non-volatile	1	U3	16MB	Flash	No	Card firmware	Pre-programmed before assembly. Can be updated using Dell/LSI tools	Not WP. Not visible to Host Processor	Cannot be cleared with existing tools available to the customer
HBA 330 PERC										
NVSRAM	Non-volatile	1	U1033	128KB	NVSRAM	No	Configuration data	ROC writes configuration data to NVSRAM	No write protect. Not visible to Host Processor	The user cannot clear memory.
FRU	Non-volatile	1	U1019	256B	FRU	No	Card manufacturing information	Programmed at ICT during production	No write protect	The user cannot clear memory.
Serial Boot ROM	Non-volatile	1	U1020	8KB	Serial Boot ROM	No	Bootloader	Pre-programmed before assembly	No write protect. Not visible to Host Processor	The user cannot clear memory.
Flash	Non-volatile	1	U3	16MB	Flash	No	Card firmware	Pre-programmed before assembly. Can be updated using Dell/LSI tools	No write protect. Not visible to Host Processor	The user cannot clear memory.

Left (Quick Sync 2.0 module) Ear											
MCU	Non-Volatile	1	USAM7	32Mb	embedded Flash	No	Card firmware	Pre-programmed before assembly	N/A	The user cannot clear memory.	
Left (status) Ear											
MCU	Non-Volatile	1	U_TINY	8KB	embedded Flash	No	Card firmware	Pre-programmed before assembly	N/A	The user cannot clear memory.	
Right Ear											
SPI Flash	Non-Volatile	1	U2	32Mb	SPI Flash	No	For field maintenance. Have License, Service Tag and system information.	SPI interface via iDRAC	Hardware strapping	The user cannot clear memory.	
TPM											
Trusted Platform Module (TPM, TPM 2.0 only)	Non-Volatile	1	U_TPM	128 Bytes	EEPROM	Yes	Storage of encryption keys	Using TPM Enabled operating systems	SW write protected	F2 Setup option	
IDSDM - vFlash											
vFlash (uSD)	Non-volatile	1	J3	16GB	NAND flash	Yes	Populate out-of-band or optionally connect to the host as mass storage and boot mechanism	User can provide data to iDRAC (entirely in the iDRAC domain) to be pushed into vFlash	No write protect	1. The card may be physically removed and destroyed or cleared via standard means on a separate computer. Or 2. The user has access to the card in the host domain and may clear it manually.	

iDSDM (uSD1, uSD2)	Non-volatile	2	J1, J2	16GB, 32GB, 64GB	NAND Flash	Yes	Provides mass storage	device resides in host domain; they are exposed to the user via an internally connected, non-removable USB mass storage device	Physical write protect switch on ACE card	(1) card may be physically removed and destroyed or cleared via standard means on a separate computer OR (2)User has access to the card in the host domain and may clear it manually
SPI Flash	Non-Volatile	1	U2	1MB	SPI Flash	SPI flash is only indirectly connected to iDRAC. iDRAC can read any address in the SPI flash, but may only write the primary firmware storage area as a part of a firmware update procedure.	Boot firmware storage, configuration and state data for iDSDM.	User can initiate a firmware update of the iDSDM device.	There is no mechanism provided to iDRAC to write any SPI NOR area outside of the primary iDSDM firmware region.	iDRAC may issue a clear command to erase all contents of the SPI NOR, but doing this will leave the iDSDM non-functional.
BOSS										
SPI FLASH	Non-Volatile	1	U17	1024KB	FLASH EEPROM	No	Boot code, FW	By programming the image via firmware update process	N/A	Use Flash tool, type "go.nsh w y"
TFRU	Non-Volatile	1	U7	64KB	FLASH EEPROM	Yes	Thermal monitoring	During Manufacturing, by programming the	N/A	By writing to Flash

								image via firmware update process.		
								During runtime, by I2C Proprietary Command Protocol		
LCD Bezel										
Microcontroller	Non- Volatile	1	IC1	256KB	Internal Flash	No	bootloader and s/w implementation of LCD command set	Updated as part of secure iDRAC software update. Configuration parameters can change only as part of iDRAC update	Writes are only allowed as part of secure iDRAC update	not user clearable.
PSU										
Microcontroller	Non- Volatile	Up to 2	Microchip	Up to 64KB	Flash PROM and EEPROM	Yes	Report PSU information and control firmware	The data is flash via Dell Update Package(DUP)	Using signature and manufacture key to protect memory write	Before firmware update, the memory will be clear.

 **NOTE:** For any information that you may need, direct your questions to your Dell Marketing contact.