NUC14RV Power LED WMI Spec

WMI Specification

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Revision 0.95

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Revision History

Version	Description	Date
0.95	1.1 Correct the input parameter definition of WMI method. 1.2~1.4 Add script example to invoke the WMI. 3 Add VersionControl WMI definition.	11/13/2024
0.93	● Initial Release	08/01/2024

1. Introduction

This document describes the details of NUC14RV (Revel Canyon) product WMI interface which allow query and control of LED configuration under Windows environment.

1.1 How to access the WMI method

MOF (Managed Object Format) – NUC provides a specific MOF in ACPI used for customer's programmed LED tool access.

GUID: 8C5DA44C-CDC3-46b3-8619-4E26D34390B7

_UID: 0

Object ID (AA): 65, 65

Instance Count: 1

Description: Method for query or update LED group.

WMI Object Name: "CISD_WMI"

Method ID(0x9): "VersionControl"

Parameter: uint32

Return Value: Package(256 bytes Array Data)

Method ID(0x101): "QueryLedGroupAttribute"

Parameter: uint32

Return Value: Package(256 bytes Array Data)

Method ID(0x102): "UpdateLedGroupAttribute"

Parameter: Package(256 bytes Array Data)

Return Value: Package(256 bytes Array Data)

Refers to the Array Data definition in the section 2.2 and 2.3.

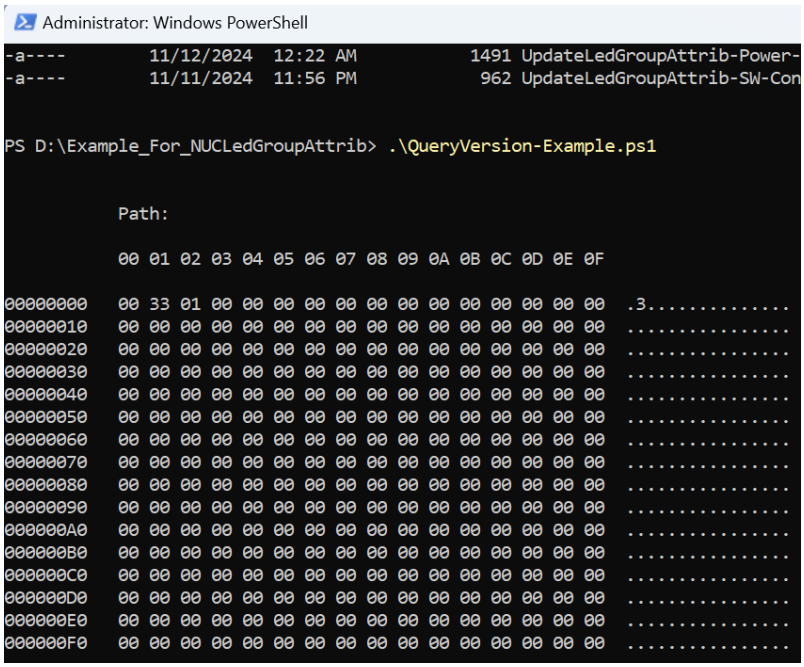
1.2 Example: Query WMI interface version

Below script code demonstrate how to invoke VersionControl WMI in Windows.

```
# Check WMI object exist
$wmiobj = Get-CimInstance cisd_wmi -Namespace "root\wmi" -ErrorAction Stop

# Get Current Led Control Data
```

(Invoke-CimMethod -InputObject $wmiobj -MethodName VersionControl -Arguments @{Cmd=1}).Data.Bytes | Format-Hex



1.3 Example: Query LED State

Below script code demonstrate how to invoke QueryLedGroupAttribute WMI in Windows.

```
# Check WMI object exist
$wmiobj = Get-CimInstance cisd_wmi -Namespace "root\wmi" -ErrorAction Stop

# Get Current Led Control Data
(Invoke-CimMethod -InputObject $wmiobj -MethodName QueryLedGroupAttribute -Arguments @{Cmd=1}).Data.Bytes | Format-Hex
```

1.4 Example: Update LED State

Below script code demonstrate how to invoke UpdateLedGroupAttribute WMI in Windows. The code would configure the LED as power state indicator. In S0, it is solid white in 100% brightness. In sleep, it is Cyan, breathing at 0.5Hz in 50% brightness.

```
# Check WMI object exist
$wmiobj = Get-CimInstance cisd_wmi -Namespace "root\wmi" -ErrorAction Stop

# Get Current Led Control Data
$LedData = (Invoke-CimMethod -InputObject $wmiobj -MethodName QueryLedGroupAttribute -Arguments @{Cmd=1})

# Prepare New Led Control Data
$NewData = @($LedData.Data.Bytes)

# Set byte 0 to 1 by update method requirement
$NewData[0] = 1
# Set byte 27 to 1 to configure LED as Power State Indicator
$NewData[27] = 1
# Set byte 29 to 7 to configure LED color to White for S0 Power state
$NewData[29] = 7
# Set byte 30 to 0 to configure LED Blink Style as Solid for S0 Power state
$NewData[30] = 0
# Set byte 31 to 0 to configure LED Blink frequency as 0 Hz for S0 Power state
$NewData[31] = 0
# Set byte 32 to 100 to configure LED Brightness to 100% for S0 Power state
$NewData[32] = 100

# Set byte 36 to 3 to configure LED color to Cyan for Sleep state
$NewData[36] = 3
# Set byte 37 to 1 to configure LED Blink Style as Breathing for Sleep state
$NewData[37] = 1
# Set byte 38 to 5 to configure LED Blink frequency as 0.5 Hz for Sleep state
$NewData[38] = 5
# Set byte 39 to 50 to configure LED Brightness to 50% for Sleep state
$NewData[39] = 50
```

```
# Call Update method
$LedData.Data.Bytes = $NewData
$Return = (Invoke-CimMethod -InputObject $wmiobj -MethodName UpdateLedGroupAttribute -Arguments @{Cmd=$LedData.Data}).Data.Bytes
$TempStr = "Return Value = "
$TempStr += "0x{0,2:X2}" -f $Return[0]
Write-Host $TempStr
```

1.5 Reference material

- MOFComp: https://msdn.microsoft.com/en-us/library/aa823192(v=vs.85).aspx
- More information about WMI and ACPI can be found here: https://msdn.microsoft.com/en-us/library/windows/hardware/dn614028(v=vs.85).aspx

2. LED Control WMI

Both QueryLedGroupAttribute and UpdateLedGroupAttribute use the same definition of LED configuration data in byte 27~39. In QueryLedGroupAttribute method, the returned data are current configuration value. In UpdateLedGroupAttribute method, the same fields are the value to be updated.

2.1 Query LED Group Attribute

		Description
Control method		WMAA
Method Name		QueryLedGroupAttribute
Arg 0		Instance
Arg 1		Method ID (101h)
Arg 2 Input Parameter	Byte 0	1
	Byte 1	0
	Byte 2 – 255	Reserved
Return Value	Byte 0	Return Code – Refers to Appendix
	Byte 1 ~ 26	Reserved
	Byte 27	**Power Button LED Usage** Report current LED usage. The LED is off in sleep mode in option 2 and 3. 0: Disabled (LED off) 1: Power State Indicator 2: HDD Activity LED 3: SW Control (Software Indicator)
	Byte 28	**Power Button LED as HDD activity behavior** Report current LED behavior if the LED usage (byte 27) is defined as HDD activity. The HDD LED would be either ON or OFF when HDD activated. 0: Active_ON. LED is on when HDD is accessing. 1: Active_OFF
	Byte 29	**Power Button LED Color for S0 Power state indicator, SW Control, or HDD activity** Report current LED color for S0 power state indicator, SW control or HDD activity. 0: Black / off 1: Blue 2: Green 3: Cyan 4: Red 5: Magenta 6: Amber 7: White
	Byte 30	**Power Button LED Blink Style for S0 Power state indicator, SW Control, or HDD activity** Report current LED blink style for S0 power state indicator, SW control or HDD activity. 0: Solid 1: Breathing 2: Pulsing 3: Strobing

	Byte 31	**Power Button LED Blink frequency for S0 Power state indicator, SW Control, or HDD activity** Report current LED blink frequency for S0 power state indicator, SW control or HDD activity. 0: 0Hz 1: 0.1 Hz 2: 0.2 Hz 3: 0.3 Hz … 10: 1 Hz
	Byte 32	**Power Button LED Brightness for S0 Power state indicator, SW Control, or HDD activity** Report current LED brightness for S0 power state indicator, SW control or HDD activity. 0: 0% 1: 1% … 50: 50% … 99: 99% 100: 100%
	Byte 33 ~ 35	Reserved
	Byte 36	**Power Button LED Sleep State Color** Report current LED color as power indicator in sleep state. 0: Black / off 1: Blue 2: Green 3: Cyan 4: Red 5: Magenta 6: Amber 7: White
	Byte 37	**Power Button LED Sleep State Blink Style** Report current LED blink style as power indicator in sleep state. 0: Solid 1: Breathing 2: Pulsing 3: Strobing
	Byte 38	**Power Button LED Sleep State Blink frequency** Report current LED blink frequency as power indicator in sleep state. 0: 0Hz 1: 0.1 Hz 2: 0.2 Hz 3: 0.3 Hz … 10: 1 Hz
	Byte 39	**Power Button LED Sleep State Brightness** Report current LED brightness as power indicator in sleep state. 0: 0%

		1: 1% … 50: 50% … 99: 99% 100: 100%
	Byte 40 ~ 255	Reserved

2.2 Update LED Group Attribute

		Description
Control method		WMAA
Method Name		UpdateLedGroupAttribute
Arg 0		Instance
Arg 1		Method ID (102h)
Arg 2 Input Parameter	Byte 0	1
	Byte 1 ~ 5	Reserved.
	Byte 6	0
	Byte 7	1
	Byte 8 ~ 26	Reserved
	Byte 27	**Power Button LED Usage** Configure current LED usage. The LED is off in sleep mode in option 2 and 3. 0: Disabled (LED off) 1: Power State Indicator 2: HDD Activity LED 3: SW Control (Software Indicator)
	Byte 28	**Power Button LED as HDD activity behavior** Configure LED behavior if the LED usage (byte 27) is defined as HDD activity. The HDD LED would be either ON or OFF when HDD activated. 0: Active_ON. LED is on when HDD is accessing. 1: Active_OFF
	Byte 29	**Power Button LED Color for S0 Power state indicator, SW Control, or HDD activity** Configure LED color for S0 power state indicator, SW control or HDD activity. 0: Black / off 1: Blue 2: Green 3: Cyan 4: Red 5: Magenta 6: Amber 7: White
	Byte 30	**Power Button LED Blink Style for S0 Power state indicator, SW Control, or HDD activity** Configure LED blink style for S0 power state indicator, SW control or HDD activity. 0: Solid 1: Breathing 2: Pulsing 3: Strobing
	Byte 31	**Power Button LED Blink frequency for S0 Power state indicator, SW Control, or HDD activity** Configure LED blink frequency for S0 power state indicator, SW control or HDD activity. 0: 0Hz 1: 0.1 Hz

		2: 0.2 Hz 3: 0.3 Hz … 10: 1 Hz
	Byte 32	**Power Button LED Brightness for S0 Power state indicator, SW Control, or HDD activity** Configure LED brightness for S0 power state indicator, SW control or HDD activity. 0: 0% 1: 1% … 50: 50% … 99: 99% 100: 100%
	Byte 33 ~ 35	Reserved
	Byte 36	**Power Button LED Sleep State Color** Configure LED color as power indicator in sleep state. 0: Black / off 1: Blue 2: Green 3: Cyan 4: Red 5: Magenta 6: Amber 7: White
	Byte 37	**Power Button LED Sleep State Blink Style** Configure LED blink style as power indicator in sleep state. 0: Solid 1: Breathing 2: Pulsing 3: Strobing
	Byte 38	**Power Button LED Sleep State Blink frequency** Configure LED blink frequency as power indicator in sleep state. 0: 0Hz 1: 0.1 Hz 2: 0.2 Hz 3: 0.3 Hz … 10: 1 Hz
	Byte 39	**Power Button LED Sleep State Brightness** Configure LED brightness as power indicator in sleep state. 0: 0% 1: 1% … 50: 50% … 99: 99% 100: 100%
	Byte 40 ~ 255	Reserved

Return Value	Byte 0	Return Code – Refers to Appendix
	Byte 1	Reserved
	Byte 2	Reserved
	Byte 3	Reserved

3. VersionControl WMI

		Description
Control method		WMAA
Method Name		VersionControl
Arg 0		Instance
Arg 1		Method ID (09h)
Arg 2 Input Parameter	Byte 0	Function Number 01h – Return the version number of the WMI interface spec compliance
	Byte 1	Parameter 1 Not required
	Byte 2	Parameter 2 Not required
	Byte 3	Parameter 3 Not required
Return Value	Byte 0	Return Code – Refers to Appendix C
	Byte 1	Minor structure revision of return data package. 0x33 for this spec.
	Byte 2	Major structure revision of return data package. 0x01 for this spec.
	Byte 3	Reserved

Appendix – Error Code Definition

Error Code	Description
00h	No Error
E1h	Function not support
E2h	Undefined device
E3h	EC no respond
E4h	Invalid Parameter
E5h	Node busy. Command could not be executed because command processing resources are temporarily unavailable
E6h	Command execution failure. Parameter is illegal because destination device has been disabled or is unavailable
E7h	Invalid CEC Opcode
E8h	Data Buffer size is not enough
EFh	Unexpected error
Others	Reserved