

Dominion® KX III CIM Guide

Last Update

This guide has been updated as of April 2020.

Purpose of this document

This document provides a guide for Computer Interface Module (CIM) usage for the [Dominion KX III](#).

■ What are Computer Interface Modules (CIM)

CIMs are the “dongles” that are used to physically connect from a Dominion KX III switch port to the target computers. One end of the CIM connects to a Cat5/6 cable, connecting it to the Dominion KX III KVM-over-IP switch. The other end connects to the target computer video (VGA, DVI, HDMI, etc.) and keyboard/mouse ports (USB or PS2).

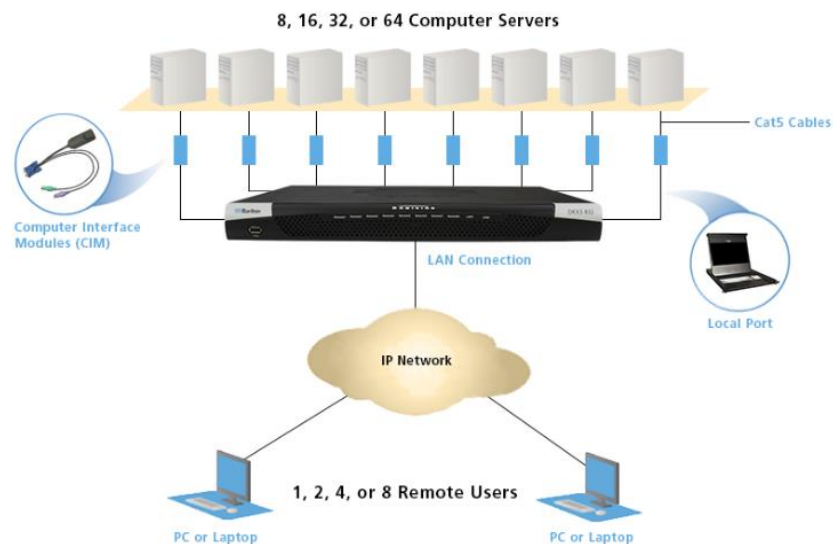


Image: Dominion KX III Topology Diagram

■ Dominion KX III CIM Compatibility

The Dominion KX III is designed to use multiple types of CIMs, including:

- **Digital video Dominion KX II CIMs:** supporting digital video formats
- **USB-C Dominion KX III and LX II CIM:** D2CIM-VUSB-USBC
- **VGA-based Dominion KX II CIMs (D2CIMs):** D2CIM-DVUSB, D2CIM-VUSB
- **VGA-based Dominion KX I CIMs (DCIMs):** DCIM-PS2, DCIM-USBG2 and DCIM-SUN
- **Remote Power Control CIMs for PX PDUs:** D2CIM-PWR
- **Dominion Serial Access Modules (DSAM):** DSAM-2 and DSAM-4
- **Select Paragon II CIMs:** select Paragon CIMs are listed below but please note that these CIMs are end-of-life. We recommend customers use Dominion CIMs instead.

■ Dominion CIM Compatibility and Feature Table

Part #	Serial	DVI	DisplayPort	HDMI	USB-C	VGA	Virtual Media	Absolute Mouse	Smart Card	Audio
D2CIM-DVUSB-DP			●				●	●	●	●
D2CIM-DVUSB-HDMI				●			●	●	●	●
D2CIM-DVUSB-DVI		●					●	●	●	●
D2CIM-DVUSB						●	●	●	●	●
D2CIM-VUSB-USBC					●		●	●		
D2CIM-VUSB						●	●	●		
DCIM-USBG2						●				
P2CIM-SER-EU	●									
DCIM-PS2						●				
P2CIM-SER	●									
DCIM-SUN						●				

NOTE: CIMs for Paragon I (EOL) are *not supported* for use with Dominion KX III. CIMs for Paragon II (EOL) are *not recommended* for use with Dominion KX III. Part numbers affected include P2CIM-AUSB, P2CIM-PS2, P2CIM-USB, P2CIM-SUSB, P2CIM-APS2DUAL, P2CIM-AUSB-DUAL. Users should look to replace these outdated CIMs with the ones as listed in the table above for improved reliability and features.

Raritan CIM page: <https://www.raritan.com/products/kvm-serial/accessories/computer-interface-modules>

■ Virtual Media and Absolute Mouse Synchronization™

A Dominion virtual media CIM is required for virtual media, Absolute Mouse Synchronization and other advanced features.

There are **three types of virtual media CIMs**

- Single-USB CIMs (**D2CIM-VUSB**) – VGA with a single USB plug
- Dual-USB CIMs (**D2CIM-DVUSB** and **D2CIM-DVUSB-xxx**) – two USB plugs
- **D2CIM-VUSB-C** CIMs: Single USB virtual media CIM with a single USB-C connection

There are **two types of video supported**

- Traditional, analog VGA video
- Digital video formats: DVI, HDMI, DisplayPort and USB-C (embedded DisplayPort)

■ **Dual Virtual Media USB CIMs (D2CIM-DVUSB and D2CIM-DVUSB-xxx)**

Dual USB CIMs have two USB connectors and support both VGA and digital video formats such as HDMI, DVI-D, or DisplayPort.

They should be purchased by customers who want digital formats and/or customers requiring the following enhanced features: **virtual media at BIOS-level, audio, tiering and/or Smart Cards** incl. the stringent US Government's **Common Access Cards (CAC)**.

Available dual USB CIMs include:

- **D2CIM-DVUSB**– enhanced, dual USB, virtual media CIM for analog, **VGA** video
- **D2CIM-DVUSB-DVI** – enhanced, dual USB, virtual media CIM for **DVI-D/DVI-I**, digital video
- **D2CIM-DVUSB-HDMI** – enhanced, dual USB, virtual media CIM for **HDMI**, digital video
- **D2CIM-DVUSB-DP** – enhanced, dual USB, virtual media CIM for **DisplayPort**, digital video

Advanced KVM features such as virtual media rely on the power of the USB protocol. But some BIOS do not support the USB specification well enough for these advanced features. We have seen a large diversity of BIOS with various limitations and deviations from the USB specification.

The **D2CIM-DVUSB** has two USB plugs, one for keyboard/mouse and one for virtual media. This enables many additional server BIOS to access virtual media drives. The **black connector** on the **DVUSB** CIM is used for keyboard and mouse. The **gray connector** is used for virtual media. Keep both plugs of the CIM connected to the device at all times. The device may not operate properly if both plugs are not connected to the target server.

■ **Digital CIMs (D2CIM-DVUSB-DVI, D2CIM-DVUSB-HDMI, D2CIM-DVUSB-DP)**

Customers with servers, PC's or MAC's using **DVI-D/DVI-I, HDMI, or DisplayPort digital video formats** should use one of the digital CIMs. These CIMs support the KX III standard video resolutions of up to 1920x1080, including widescreen formats.

DDC/E-EDID is supported by the digital CIMs with the “**preferred timing mode**” set by the Dominion KX III administrator. This is the preferred/native/default video resolution, called the “**Display Native Resolution**” on the KX GUI. The default is 1280x1024@60hz, but this can be changed by the user on the *Port Configuration Page* for each port.

DDC/E-EDID communicates to the server to tell it what video resolution to use, however not every server/OS/video card will use it. See the release notes and documentation for more information.

Only Single Link DVI and HDMI are supported. For HDMI, **HDCP** (High-bandwidth Digital Content Protection) is ~~not~~ supported. Digital audio is supported over USB as in previous releases, not embedded in the HDMI or DisplayPort signals.

■ **DVI Compatibility Mode for HDMI CIMs**

Servers may output video using limited range RGB in accordance with HDMI standards. The result is that the video may be too dark or light. We have seen this with Dell Optiplex servers at 1920x1080. Also for Apple's Mac Mini using the HDMI port.

A 'DVI Compatibility Mode' check box is available on the GUI for each port. This mode will provide the DVI E-EDID to the target upon request. The server will output a DVI compatible video signal. This improves the video quality for some servers.

■ **Single USB Virtual Media CIM (D2CIM-VUSB)**

The **D2CIM-VUSB** has a single USB connector and is for customers who will use virtual media primarily **at the OS level**. It does not support the enhanced features or digital video.

All virtual media CIMs support virtual media sessions to target servers supporting the USB 2.0 interface. These CIMs support Absolute Mouse Synchronization as well as remote firmware update.

▪ **USB Profile Feature**

In addition, Raritan has developed the **USB Profile** feature. A **USB Profile** customizes the KX III's USB interface with the target server for a particular BIOS or OS USB implementation. Many of these USB Profiles have been created. They are available for use from inside of the KVM Clients. See the Dominion KX III user documentation for more information.

▪ **Varying Server Support for Virtual Media**

Not all servers and operating systems support all virtual media options:

- In general, modern Windows[®] OS' do, as well as older Windows 7/8, Vista[™], with the latest patches.
- Target Servers running Linux and Mac OS', when accessed from a Windows client, will generally mount CD/DVD drives, USB drives and ISO images.
- Mac[®], Linux and Solaris[™] clients support virtually all media types. Read user documentation for more info.
- Other UNIX based OS' may not support virtual media.

■ **New Single USB-C Virtual Media CIM (D2CIM-VUSB-USBC)**

In 2020, there is a new single USB virtual media CIM supporting a **single USB-C connection** to the target computer. It supports embedded DisplayPort video, keyboard, mouse with the virtual media and absolute mouse synchronization features.

NOTE: Dominion KX III Firmware version 3.6 or above must be used.

The new **MAC USB-C profile** must be used on Macs. When the Native Resolution is configured on the KX3, the same resolution doesn't necessarily display on the MAC Notebook. To ensure conformity, the "Best for" option needs to be selected on the MAC computer instead of "Scaled."

D2CIM-VUSB-USBC does **not** support Smart Card, tiering and audio.

■ **Virtual Media CIM Bulk Pricing**

Packages of 32 and 64 D2CIM-DVUSB and D2CIM-VUSB CIMs provide a discount for buying in volume. Packages of 64 digital CIMs are also available. Consult your authorized reseller for more information.

■ **Not all servers support Absolute Mouse Synchronization**

Again, a USB server port is required, and the OS must support this technology. Microsoft Windows and Mac servers support this, but some older OS may not.

■ **Dominion Power CIMs for KX III Remote Power Control with PX PDU's**

Use **D2CIM-PWR** CIMs (Dominion KX III series only) to connect to Raritan PX intelligent power strips to perform remote power control. This CIM does **not** work with Servertech PDUs.

On PX you should connect the D2CIM-PWR via the Serial port and with PX2/PX3 connect via the Feature port.

■ **DCIM-USBG2 – Basic USB CIM**

The **DCIM-USBG2** is an older, more basic, VGA-based USB CIM for customers not wanting virtual media, absolute mouse synchronization or other advanced features as found on many of the other Dominion CIMs. However, the information below also applies to this CIM, which can be used with the Dominion KX III.

The DCIM-USBG2 supports both USB and SUN USB. A small switch on the unit determines USB or SUN USB. For Windows targets, the “P” setting should be used. For Sun targets, the “S” setting should be used. For other OS, start with the “P” position. If the keyboard and/or mouse do not operate correctly, switch to the “S” position.

Important Note: You must power cycle the CIM if you change the switch setting while the CIM is connected to the target server.

Steps to power cycle the CIM:

1. Remove the USB connector from the target server. The video connector can remain in place.
2. Wait 5 seconds.
3. Reconnect the USB connector.

You can configure the CIM using a setup menu for various operating modes, such as keyboard and mouse types and keyboard language. See **DCIM-USBG2 Set Up Menu on page 8** of this document for more information.

■ **Digital Visual Interface (DVI-I & DVI-A)**

Servers with DVI ports that support DVI-A (analog) and DVI-I (integrated analog and digital) can use the **Raritan ADVI-VGA adapter** to convert the DVI port to a standard VGA plug that can be connected to a KX III CIM's VGA plug.

ADVI-VGA adapters can be used with any Raritan CIM which has a VGA plug.

Servers with DVI ports that support DVI-I or DVI-D (digital) can use the **D2CIM-DVUSB-DVI** CIM.

■ **Dominion Serial Access Modules (DSAM) – DSAM-2 and DSAM-4**

With Raritan's new **Dominion Serial Access Modules (DSAM)**, users can manage up to 8 serial devices connected to a Dominion KX III or Dominion LX II KVM-over-IP switch. The two (DSAM-2) and four (DSAM-4) port modules provide true, Java-free serial access to devices such as LAN switches, routers and Linux/Unix servers. DSAM's are perfect for remote and branch offices where both KVM and serial access is needed.

The DSAM modules provide four and eight ports of true serial access from a Dominion KX III or LX II switch. Connect one or two modules to the switch's USB ports for Java-free serial access. Manage switches, routers, Linux/Unix servers and other serial devices together with KVM-over-IP access to servers, PC's and workstations.

DSAMs provide high speed serial access via RJ-45 ports connected via Cat5 cables, up to 230K baud. Automatic DTE/DCE detection means rollover cables are never required!

The DSAM is a Zero-U device that does not require rack space. Powered by the KVM switch, external power adapters are not required. No rollover cables!

With **DLX2-xxx-LED** models **one** DSAM module of choice can be connected.

DSAM product information: <https://www.raritan.com/products/kvm-serial/accessories/dominion-serial-access-modules>

NOTE: The now end-of-life **P2CIM-SER** and **P2CIM-SER-EU** (European market) were previously used to connect a serial device (i.e. networking device, headless server) to a Dominion KX III. Dominion Serial Access Modules are recommended instead.

■ CIM Usage for Blade Servers

Release 3.0 and above supports access, control and management for Dell, HP, Cisco and IBM Blade Servers. The type of CIM to be used for KVM access depends on the KVM ports on the blade chassis or blade server the CIM is connected to, and whether advanced features such as virtual media and absolute mouse synchronization are wanted and supported by the blade server.

CIMs are connected to blade servers in two ways: (1) connect CIMs to each individual blade server or (2) connect a CIM to the blade server chassis' internal KVM switch or management module. The following table describes the supported methods:

Blade Chassis	CIM to Chassis	CIM to Blade
Dell 1855 & 1955	✓	✓
Dell M1000e	✓	
HP c7000		✓
HP c3000		✓
IBM S, H, E & HT	✓	
IBM T	✓	
Cisco UCS		✓
Generic	✓	

In general, most blade servers have USB ports, but certain older blade servers have PS2 ports. The following CIMs are used with blade servers:

- **DCIM-PS2** – PS/2 ports
- **DCIM-USBG2** – USB ports, no virtual media
- **D2CIM-VUSB** – USB, virtual media (if blade server supports it)
- **D2CIM-DVUSB** – USB, BIOS virtual media (if blade server supports it)

■ Types of Blade Server Support

The supported and recommended CIMS for the different types of blade servers is as follows:

Blade Chassis	DCIM-PS2	DCIM-USBG2	D2CIM-VUSB	D2CIM-DVUSB
Dell 1855 Dell1955	✓	✓ (connected to blade)	✓ (connected to blade)	✓ (connected to blade)
Dell M1000e		✓		
HP c3000 HP c7000		✓ (connected to blade)	✓ (connected to blade)	✓ (connected to blade)
Cisco UCS		✓ (connected to blade)	✓ (connected to blade)	✓ (connected to blade)
IBM H IBM E		✓		✓
IBM S IBM HT		✓		Haven't tested and certified these for virtual media
IBM T	✓			
Generic	✓	✓		

In the above table, if the check (✓) is accompanied by the phrase "(connected to blade)", then the CIM is connected to each individual blade server. Otherwise the CIM connects to the blade chassis' internal KVM switch or the management module.

When connecting to individual Dell 1855/1995 blades, the “USB Front Dongle for Dell PowerEdge 1855/1955” cable is required; manufacturer part number N8138 and Dell part number 310-6484.

When connecting to individual HP c3000 and c7000 blades, the “HP c-Class Blade SUV Cable” is used; part # is 416003-001. Note: the internal KVM module for the HP c3000 is not supported in this release.

Virtual media and advanced mouse synchronization is supported on blade servers where a CIM is connected to each blade server, assuming the operating system on the blade supports these features.

Virtual media is also supported on the IBM Blade Center E and H chassis when using the D2CIM-DVUSB with the gray USB plug connected to the media tray (front panel) and the black plug to the management module (back panel). The connection to the Media Tray (front panel) will require the use of an USB extension cable connected to the gray USB plug on the D2CIM-DVUSB. Auto-discovery must be enabled on the KX III Port Configuration page for virtual media to work.

See the documentation and release notes for more information on the blade server feature.

■ **Smart Card and CAC Usage**

The Dominion KX III based Smart Card / CAC Solution is available. **The D2CIM-DVUSB, D2CIM-DVUSB-xxx CIMs are required for Smart Card and US Government Common Access Card (CAC) use.** No other CIMs will support a Smart Card connection to a target server.

■ **Digital Audio over IP Support**

The Dominion KX III based Audio over Virtual Media feature is available. **D2CIM-DVUSB** and **D2CIM-DVUSB-xxx** digital CIMs support audio.

■ **Paragon II Dual CIMs Now End-of-Life (P2CIM-APS2DUAL & P2CIM-AUSBDUAL)**

Paragon II “Dual CIMs” are now **end-of-life**:

- **P2CIM-APS2DUAL** – for PS2 ports
- **P2CIM-AUSBDUAL** – for USB ports

While they can be used, as they are end-of-life, **we no longer recommend their use.**

■ **Tiering (Cascading) Feature**

KX III to KX III tiering will use the KX III’s Tiering Port and does not require a CIM.

For the generic hot-key based tiering, **D2CIM-DVUSB** or **D2CIM-VUSB** CIMs can be used.

■ DCIM-USBG2 Setup Menu

This setup menu allows you to configure the CIM for various settings, such as keyboard and mouse types and keyboard language. To access the menu, press the Left-CTL and Num Lock keys simultaneously when a text editor window (in text input mode) has the focus on the target server. All settings are saved in non-volatile memory so the CIM will “remember” these settings. The setup menu as shown in Microsoft Windows Notepad is as follows:

```

usb 0F0 hw2
----
keyboard layouts
33 english us
32 english uk
08 french
09 german
26 swedish
19 norwegian
15 japanese
25 spanish
14 italian
16 korean
----
additional keyboard settings
a0 lazy LED update off
a1 lazy LED update on
a2 sunFire patch off
a3 sunFire patch on
----
mouse layouts
m0 standard 3 button wheel mouse
m1 4-8 button wheel mouse
----
current options
keyboard layout is 33 (lazy LED update: on, sunFire patch: on)
mouse layout is 0
----
enter an option or escape to exit
>
  
```

The first line identifies the CIM FW and HW versions. The FW version is in hexadecimal.

Section 1 defines the user keyboard language setting. If you are using a German keyboard, for example, you will enter 09 at the menu prompt (>).

Section 2 defines additional keyboard settings:

- **Lazy LED Update.** When OFF, the CIM sends all LED status messages from the target server to the switch. When ON, the CIM sends only status messages that are different from the message sent previously. Some target servers send the same status continually, possibly overloading the switch. This option prevents the overload.
- **Sun Fire Patch.** A new option introduced in firmware 0EF handles the non-standard USB operation of some Sun Fire target servers. If these servers do not receive a keyboard packet periodically, they assume the keyboard and mouse are disconnected and do not respond to further input. When the switch is in the 'S' position, and the feature is enabled (default), the CIM sends an empty keyboard packet every 500 milliseconds. The feature can be disabled via the CIM setup menu. It is safe to leave this feature on, even when not required as the only side effect will be unnecessary data sent to the target server.

Section 3 defines the mouse type. Standard 3-button wheel mice (m0) and up to 8-button mice and trackballs (m1) are supported currently. The proper driver for the mouse must be installed on the target server.

Section 4 displays the current settings.

This setup menu information also applies to the Paragon II P2CIM-AUSB.

■ **Recommended USB CIM Usage**

For Dominion KX III, the recommended usage depends on the type of video (VGA vs digital), features desired and the type of server:

Customer Needs	CIM to Use
<ul style="list-style-type: none"> Digital video formats BIOS use of virtual media Advanced D2CIM-DVUSB features 	<p>D2CIM-DVUSB-DVI D2CIM-DVUSB-HDMI D2CIM-DVUSB-DP</p>
<ul style="list-style-type: none"> VGA-based video BIOS use of Virtual Media Advanced features: virtual media, absolute mouse synchronization Required for Smart Card/CAC use Required for audio support Windows, Linux and Mac servers 	<p>D2CIM-DVUSB</p>
<ul style="list-style-type: none"> Single USB-C connection For Apple Macs, laptops and other computers with USB-C ports Supports virtual media and absolute mouse Not supported: Audio and SmartCard/CAC 	<p>D2CIM-VUSB-USBC</p>
<ul style="list-style-type: none"> VGA-based video OS use of Virtual Media Advanced features: virtual media, absolute mouse synchronization Windows, Linux and Mac servers 	<p>D2CIM-VUSB</p>
<ul style="list-style-type: none"> VGA-based video SUN USB Servers Unix Servers 	<p>DCIM-USBG2</p>
<ul style="list-style-type: none"> VGA-based video Basic CIM features USB Servers 	<p>DCIM-USBG2</p>