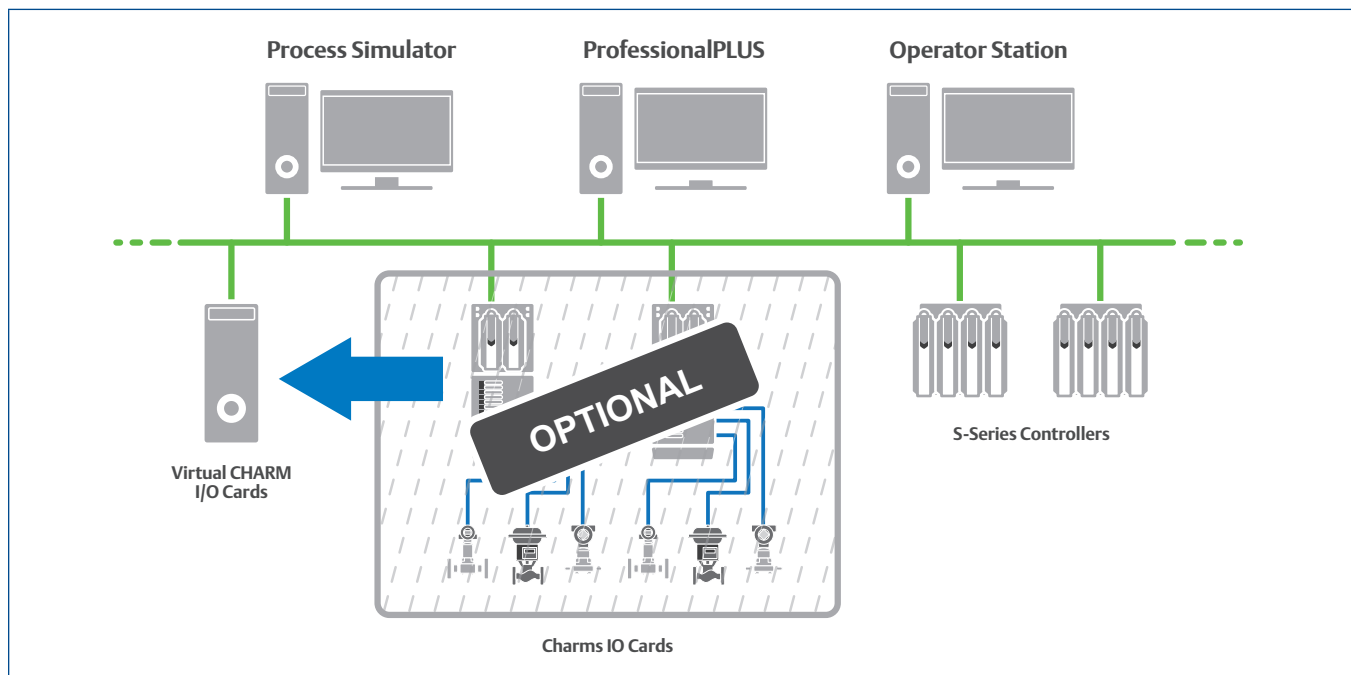# DeltaV™ Virtual CHARM I/O Card Simulation



*DeltaV™ Virtual CHARM I/O Cards provide simulated process I/O from a workstation PC.*

- Provides DeltaV™ CHARM I/O Card Simulation from a host computer

- Eliminates I/O hardware during FAT

- Supports rigorous testing of control configurations and operator graphics

## Introduction

DeltaV™ Virtual CHARM I/O Card simulation provides a cost effective and easy way to simulate process I/O during control system development and checkout. Prior to CHARM I/O cards, special virtual I/O module (VIM) hardware was required to emulate I/O cards and provide simulated process I/O during system checkout. With CHARM I/O cards, you now have two options for simulated I/O without using VIMs. You can use the real CHARM I/O card in simulate mode, or you can use virtual CHARM I/O card software which runs in a host computer.

DeltaV Virtual CHARM I/O Card simulation has the advantage of reduced hardware staging and it frees up the real CHARM I/O cards for installation and I/O checkout at the production site. This capability can significantly reduce project schedule when site I/O checkout and control system FAT are performed in parallel.

Virtual CHARM I/O cards appear the same as real CHARM I/O cards within the DeltaV system. When first connected they appear as decommissioned nodes in DeltaV and can be commissioned the same as real cards. CHARM assignments and simulated I/O behavior are also the same as with real CHARM I/O cards.

With DeltaV Virtual CHARM I/O Card simulation you can rigorously test your control strategies, operator graphics, and I/O assignments prior to implementing on-line. Simulated I/O can be manually entered, generated from a test pattern, or provided from a Mimic™ process simulation via OPC. With virtual CHARM I/O card simulation you can validate your control system without any control configuration changes.

## Benefits

**Provides simulated CHARM I/O cards from a workstation PC.** Virtual CHARM I/O card simulation provides the ability to simulate process I/O from a host computer for control system development and checkout. This simulated I/O appears the same as real I/O throughout DeltaV system and requires no changes to graphics or control configurations.

**Eliminates I/O hardware during FAT.** Virtual CHARM I/O cards eliminate the need for additional I/O hardware during FAT such as Virtual I/O Modules (VIMs). No more wiring and swapping out VIM cards during FAT. With Virtual CHARM I/O cards, the real CHARM I/O cards can be sent to site for early wiring and I/O checkout.

**Supports rigorous testing of control configurations and operator graphics.** Virtual CHARM I/O card simulation enables rigorous testing of control applications without any configuration changes. Control modules are tested running in their assigned controllers with simulated I/O that appears identical to real I/O. For complex control strategies, the virtual CHARM I/O cards can be driven by a Mimic process simulator which can emulate complex process behavior.

## Product Description

DeltaV Virtual CHARM I/O cards provide all the simulation functionality as real CHARM I/O cards running in simulation mode. The difference is that virtual CHARM I/O cards run in a computer and do not require additional I/O hardware. Each virtual I/O card runs in a separate virtual machine on a host computer. Virtual CHARM I/O cards are supported with DeltaV Virtual Studio and VMware workstation and ESXi virtualization environments. The number of virtual CHARM I/O cards on a host computer depends on the available CPU and memory on the host. *See DeltaV Virtual Studio product data sheet or VMware Implementation Guidelines for system planning information.*

Once the virtual CHARM I/O cards are installed and connected to the DeltaV network, you can commission the virtual CHARM I/O card in the same way you commission real CHARM I/O cards. Once commissioned, you can provide simulated I/O using the DeltaV CHARM Simulate application as show in Figure 1. You may also provide simulated process I/O via Mimic using OPC. Up to 96 CHARMs are supported on each virtual I/O card. Virtual CHARM I/O cards must be assigned to either a real or virtual S-series or PK Controller. Simulated CHARMs are not supported for control modules assigned to run in a DeltaV Application or ProPlus workstation.
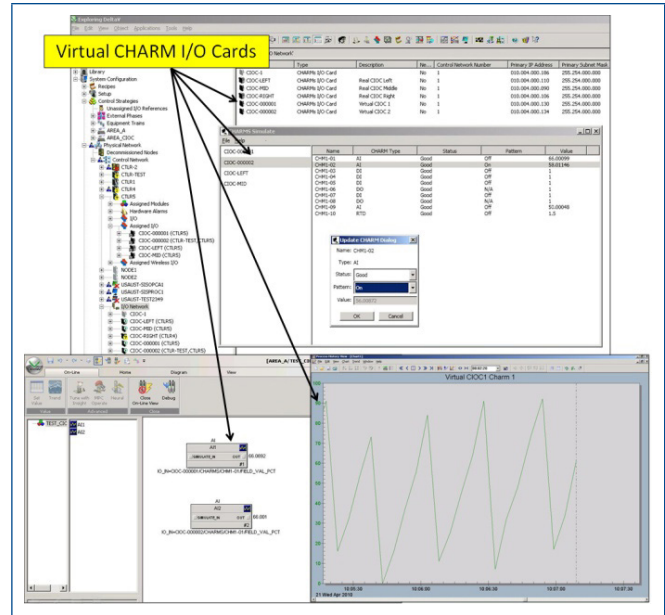


***Figure 1.** DeltaV Virtual CHARM I/O Card Example.*

*Note: DeltaV CHARM I/O Card simulation supports HART analog signals but does not support HART digital parameters. HART digital parameters may be simulated in control module function blocks where they are referenced.*

### DeltaV Virtual Studio

DeltaV Virtual Studio is an integrated DeltaV application environment designed for easy implementation and management of virtual DeltaV control systems for both off-line and on-line production systems. DeltaV Virtual Studio is used to create, modify, start, stop, and move DeltaV virtual machines. Virtual CHARM I/O cards are easily created and assigned to host computers using DeltaV Virtual Studio. Figure 2 shows the DeltaV Virtual Studio application.
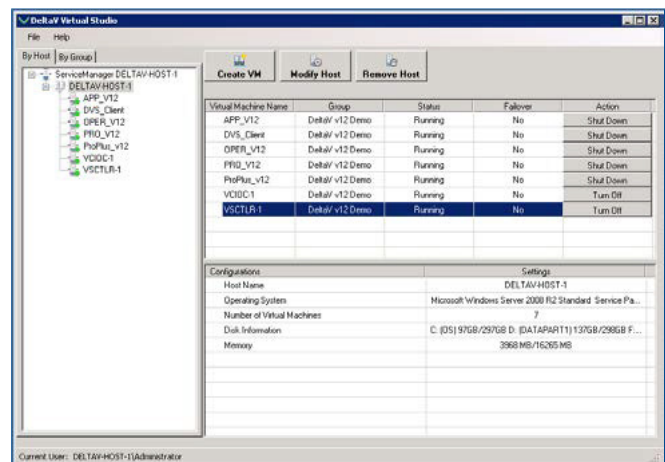


***Figure 2.** DeltaV Virtual Studio Application.*

Virtual CHARM I/O cards are easy to create and implement using DeltaV virtual machine templates. These templates allow you to easily add virtual I/O cards from a single configuration dialog. Simply specify the host computer, enter a node name, select the DeltaV CHARM I/O Card template, select the network connections from a drop down menu, and press OK. Within a minute or two the new CHARM I/O card will be automatically generated from a prebuilt template. *For more information, see the product data sheet for DeltaV Virtual Studio.*
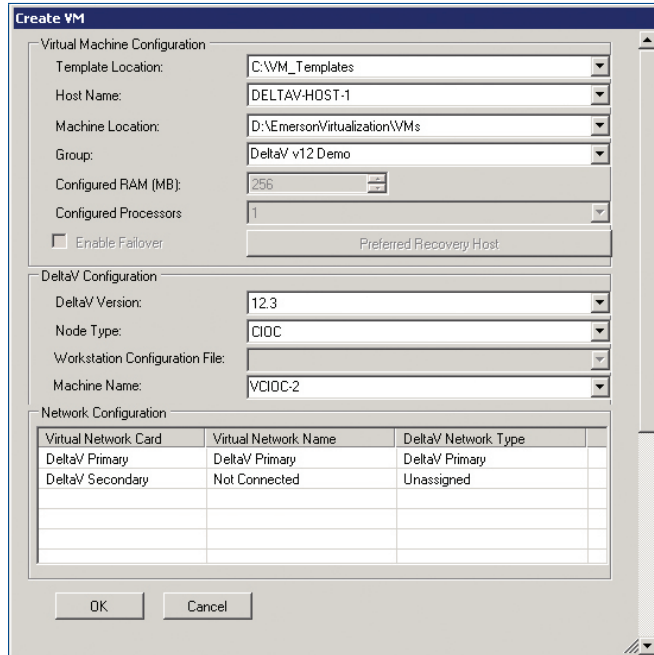


**Figure 3.** *Creating a Virtual CHARM I/O Card.*

## Licensing

DeltaV Virtual CHARM I/O Cards are licensed per card for a specific DeltaV system ID. A base license must be purchased and then additional virtual CHARM I/O cards can be added for up to 300 total I/O cards. The licenses are sold in quantities of 1, 5, 10, and 20 as described below. Virtual CHARM I/O cards may be distributed across multiple host computers on a single DeltaV system only. The licenses are tied to a specific system ID and will not operate on multiple DeltaV systems.

## Subscription-Based Licensing

Starting with DeltaV v15.LTS, Virtual CHARM I/O Cards will be available for purchase in subscription-only licensing for new systems.

The subscription-based licensing will let you to avail flexible term lengths allowing you to purchase only what is needed and enabling you to reduce the upfront capital investment for a simulation environment.

Please see the Ordering Information section for details.

## Product Specifications

| Virtual CHARM I/O Card (CIOC) Specifications | |
|---|---|
| Number I/O Channels | 96 Channels. Individually defined IO signal types. |
| Number of I/O Clients | 4 (Controllers) |
| Number of Virtual CIOC's per Controller | 16 |
| Number of Virtual CIOC's per System | 300 |
| Number of Virtual CIOC's per Host Computer* | Recommend maximum of 40 per host computer. Dependent on host computer resources. See DeltaV Virtual Studio for System Planning Guidelines. |
| Redundancy | Not Available. Redundancy is not available for virtual CIOCs. |

*Virtual CHARM I/O Cards must run in DeltaV host computers, not traditional DeltaV workstations. See DeltaV Virtualization Hardware product data sheet for available host computer information.*

## Ordering Information*

| Description | Perpetual Model Number | ***Subscription Model Number |
|---|---|---|
| **For orders to be shipped after v12.3 release date (approx. June 1, 2013)** | | |
| DeltaV Simulate Virtual CHARM I/O Card (Base License) | VX1018S001 | VX1018SwS001_YyFYzz |
| DeltaV Simulate Virtual CHARM I/O Card Scale-up, 1 Card | VX1018UPS01 | VX1018SwUPS01_YyFYzz |
| DeltaV Simulate Virtual CHARM I/O Card Scale-up, 5 Cards | VX1018UPS05 | VX1018SwUPS05_YyFYzz |
| DeltaV Simulate Virtual CHARM I/O Card Scale-up, 10 Cards | VX1018UPS10 | VX1018SwUPS10_YyFYzz |
| DeltaV Simulate Virtual CHARM I/O Card Scale-up, 20 Cards | VX1018UPS20 | VX1018SwUPS20_YyFYzz |
| **For orders to be shipped before v12.3 release date (approx. June 1, 2013)*** | | |
| Virtual CHARM I/O Card (Base License) | VF1018S001 | Not Applicable |
| Virtual CHARM I/O Card Scale-up, 1 Card | VF1018UPS01 | Not Applicable |
| Virtual CHARM I/O Card Scale-up, 5 Cards | VF1018UPS05 | Not Applicable |
| Virtual CHARM I/O Card Scale-up, 10 Cards | VF1018UPS10 | Not Applicable |
| Virtual CHARM I/O Card Scale-up, 20 Cards | VF1018UPS20 | Not Applicable |

*Ordering information is for licenses only. Virtual CHARM I/O Card software is provided with the media kits as described in the DeltaV Virtual Studio product data sheet.*

**Orders shipped before v12.3 release date will not include Virtual CHARM I/O Card simulation for DeltaV v12.3.*

*** **Note:** *DeltaV Simulate Virtual CIOC licensing starting DeltaV v15.LTS can be purchased as a one-year, three-year, or five-year subscription which includes licensing, updates, and support.*

*These model numbers are for initial subscriptions only; model numbers for renewals are listed separately in the price book.*

*** *w represents the length of the subscription term in years (1, 3, or 5).*

*** *y represents the specific year of the subscription term (1, 2, 3, 4, or 5).*

*** *zz represents a two-digit indicator of the year of purchase (e.g. 23).*

*For existing customers with perpetual DeltaV Simulate Virtual CIOC licenses who wish to expand and/or upgrade their DeltaV Simulate system, please contact your local sales office.*

## Prerequisites

DeltaV v11.3.1 or later is required.

## Related Products

- **DeltaV Virtual Studio** is an integrated DeltaV application environment designed for easy implementation and management of virtual DeltaV control systems for both off-line and on-line production systems. Virtual machine templates are provided for automatic generation and configuration of DeltaV workstations and controller hardware. *For more information, see product data sheet for DeltaV Virtual Studio.*

- **DeltaV Virtual Machine Controller Simulation.** For off-line use, virtual hardware controllers provide an effective way to checkout control configuration and IO assignments for both classic I/O and CHARM I/O cards. The virtual controllers can be named and configured the same as real controllers so that no configuration changes or module re-assignments are required. S-series and M-series controllers are supported for DeltaV v11.3.1 and later. Virtual machine PK Controllers are available for v14.3 and later. *For more information see product data sheet for DeltaV Virtual Machine Controller Simulation.*

- **Mimic Simulator** supports both simple tie-back simulation and rigorous first principle process simulation. Mimic has special I/O drivers developed to support DeltaV Virtual CHARM I/O Cards. Refer to Mimic product data sheets for more information.

## Related Hardware Products

- **DeltaV Virtualization Hardware.** Rigorously tested and supported computer and peripheral devices for use with DeltaV Virtual Studio. Hardware includes host servers, storage area network (SAN), thin clients, network switches, and related hardware required for DeltaV Virtualization. *For more information, see product data sheet for DeltaV Virtualization Hardware.*

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