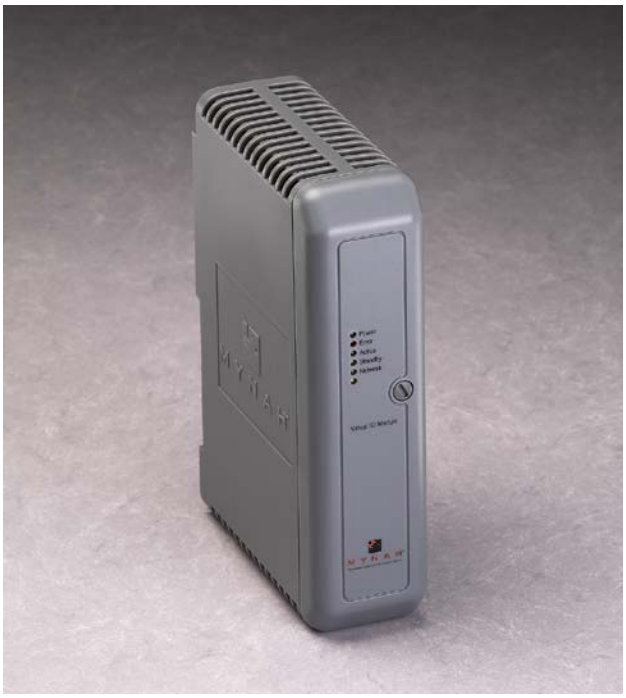
# Virtual I/O Module Network Gateway

The Virtual I/O Module (VIM) Network Gateway provides a native DeltaV I/O interface to open plant Ethernet networks and devices that use the Modbus TCP/IP or Ethernet/IP protocol. DeltaV Controllers can read and write signals from plant floor devices that use Ethernet networks such as PLCs, Motor Control Centers, and Weigh Scales.



## VIM Advantages

- Easy to use
- Powerful Integration Solution
- Modular, Flexible Package

### Seamless DeltaV Integration

Each Virtual I/O Module is seen by the DeltaV Controller as up to 4 Virtual DeltaV Serial Cards. Commissioned Virtual I/O Modules are auto sensed by the DeltaV autosense I/O function as DeltaV Serial Card(s).

### Configured in DeltaV Explorer

Dataset configuration is done in the DeltaV Explorer in the same manner as a DeltaV Serial Card. I/O signals can be used in DeltaV Control Modules and displayed on DeltaV Operate graphics.

### Intuitive Setup

The VIMNet Explorer Utility makes setup of the Virtual I/O Module easy and intuitive. Graphical, drag-and-drop functionality makes setting up the plant Ethernet network quick and easy.

### Powerful Integration Solution

Each Virtual I/O Module can emulate up to 4 DeltaV Serial Cards and support up to 128 Serial Card Datasets of information from 32 network addresses. Communication over the plant Ethernet network is fast and efficient.

## Flexible Networking

User configurable IP addressing allows the Virtual I/O Module to be used in almost any plant environment regardless of networking scheme. The Virtual I/O Modules and the plant Ethernet devices must be on the same IP subnet to communicate.

## 1:1 Module Redundancy

Redundancy can be added to any system by adding a second Virtual I/O Module and configuring the two modules as a redundant pair. The Virtual I/O Module appears as up to 4 Redundant DeltaV Serial Card pairs.

## Automatic Switchover

Automatic switchover of primary to standby cards is handled like the DeltaV Serial Card. The operator is given clear notification of a switchover at the operator display. Manual switchover can be controlled in DeltaV Diagnostics.

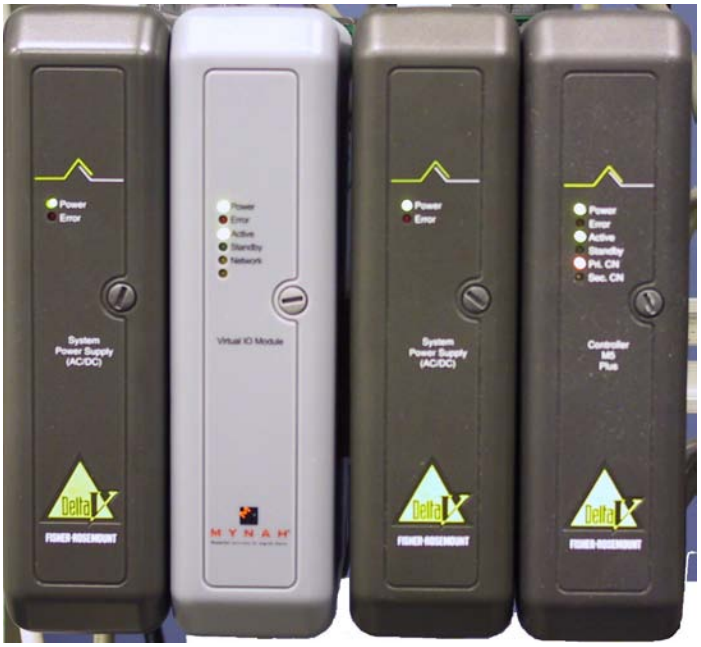
## Modular Flexible Package

**Easy to Install -** The DeltaV Virtual I/O Module mounts in the same manner as the DeltaV controller. It uses a DeltaV 2-wide, 4-wide, or vertical carrier and Power Supply connected to the DeltaV I/O Bus by the carrier side connector.

**Rugged, Dependable -** The DeltaV Virtual I/O Module is designed to provide years of uninterrupted use.

## VIM Product Description and Specification

The Virtual I/O Module mounts on a 2-wide carrier on the left-hand-side of the DeltaV controller. A dedicated DeltaV power supply is required. The DeltaV Controller auto-senses a commissioned Virtual I/O Module as 4 DeltaV Serial Cards.



In **simplex installations**, these cards will be sensed in slots 57-60 or 61-64.

In **redundant installations** the redundant pairs will be sensed in slots 57 to 64. Configuration of the I/O signals from the commissioned Virtual I/O Module is done in the DeltaV Explorer in the same manner as a DeltaV Serial card.

**VIMNet Utility -** The VIMNET Utility allows the user to commission the Virtual I/O Module, setup primary and redundant Virtual I/O Modules, and the Plant Ethernet Network.

The user is able to specify the IP address, Subnet Mask, and Gateway of each Virtual I/O Module and set the node address and names of each Plant Ethernet Network device that is used by the Virtual I/O Module.

The VIMNET Utility runs on any Win NT/2000/XP PC and has an intuitive, graphical user interface. Connection to the Virtual IO Module is done through the Module RJ-45 Ethernet Connection.

**Module Redundancy -** Two Virtual I/O Modules can be set up as a redundant pair for installation that require backup plant networks. Each Virtual I/O Module will be installed on its own 2-wide carrier, with its own power supply to the left of the DeltaV Controller.

The primary and standby Virtual I/O Modules monitor each other with a continuous status command across the Ethernet Network. The primary Virtual I/O Module communicates over the network.

| Specifications for the VIM | |
|---|---|
| **Power Requirement** | **Supplied by System Power Supply through 2-wide Power/Controller Carrier** |
| **Maximum Current** | **2.0 A** |
| **Fuse Protection** | **3.0 A, non-replaceable fuses** |
| **Power Dissipation** | **4.0 W typical, 5.4 W maximum** |
| **VIM User Memory** | **16 MB** |
| **Mounting** | **On right slot of power/controller carrier OR vertical carrier** |
| **External Plant Ethernet Network** | **One 10BaseT 8-pin RJ-45 Connector** |
| **Size Dimensions** | ***X*** |
| **Weight** | ***X*** |
| **Environmental Specifications** | |
| **Operating Temperature** | **0 to 60 ° C (32 to 140 ° F)** |
| **Storage Temperature** | **-40 to 85 ° C (-40 to 185 ° F)** |
| **Relative Humidity** | **5 to 95%, non-condensing** |
| **Airborne Contaminants** | **ISA-S71.04-1985 Airborne Contaminants Class G2** |
| **Shock** | **10 g ½-sine wave for 11 ms** |
| **Vibration** | **1 mm peak-to-peak from 5 Hz to 16 Hz,<br>0.5 g from 16 Hz to 150 Hz** |
| | |
| **LED Indicators** | ***ON Status*** |
| **Green -- Power** | **Indicates DC power is applied** |
| **Red -- Error** | **Indicates an error condition** |
| **Green -- Active** | **Indicates that the VIM is commissioned and active** |
| **Green -- Standby** | **Not used** |
| **Yellow Flashing -- Network** | **Indicates valid network communication** |
| **Yellow Flashing – Ctlr I/O** | **Indicates valid DeltaV I/O Bus communication** |
| **All except Power flashing, alternating even and odd** | **Visual ID of controller initiated from user interface software by ping command** |
| **VIM Capacity** | |
| **# Emulated DeltaV Serial Cards** | **4** |
| **# data sets per VIM** | **128 (32 per Emulated Card)** |
| **# TCP/IP Master/Slave or Adapter Nodes per VIM** | **Redundant mode:** 16 slaves only<br>**Simplex mode:** 32 slaves<br>**Simplex mode mix:** 16 slaves and 16 masters |

# Supported Protocol Information

**Modbus TCP/IP -** The Virtual I/O Module with the Modbus TCP/IP Master Driver supports the following Modbus communications protocol function codes to read and write values to and from a Modbus slave device, as specified by the Modbus Application Protocol Specification from Modbus-IDA.org.

The Virtual I/O Module Modbus TCP/IP Driver supports for the following Modbus function codes:

| VIM Modbus Function Codes Supported | |
|---|---|
| Code 1 | Read Coil Status |
| Code 2 | Read Input Status |
| Code 3 | Read Holding Registers |
| Code 4 | Read Input Registers |
| Code 5 | Force Single Coil |
| Code 6 | Preset Single Register |
| Code 8 | Diagnostic Loop Back Test |
| Code 15 | Force Multiple Coils |
| Code 16 | Preset Multiple Registers |

The VIM can function as both a Modbus TCP/IP master and slave simultaneously. Master or slave mode is set at the virtual port level. In master-only mode, this driver can communicate with a maximum of 32 slave devices. Systems that use both master and slave mode can communicate with a maximum of 16 slaves and 16 masters at the same time. The master and slave capability is available in simplex implementations only. In redundant applications, only master mode is supported.

**Ethernet/IP -** The Virtual I/O Module with the Ethernet/IP Scanner Driver provides the following compatible functions using the Control and Information Protocol (CIP) as defined in the Ethernet/IP Specification from Open DeviceNet Vendor Association & ControlNet International.

The Virtual IO Module Ethernet/IP Scanner Class Driver provides:

- Ethernet/IP Scanner Class (originator) functionality
- UCMM (unconnected) messaging client and server
- Class 3 (connected) messaging client and server, including encapsulated DF1 message
- Class 1 (I/O) connection client and server

# VIM Ordering Information

## Prerequisites

1. For each controller, select a mounting carrier. Please refer to the appropriate DeltaV Controller product data sheets for details: DeltaV MD or M5 Controller, Power Supply, and 2-Wide Controller Carrier.
2. Each controller requires a dedicated system power supply. Please refer to the DeltaV Power Supplies product data sheet for details.
3. Each configured DeltaV Serial Card Port (16 Datasets) will require one VE4102, Serial Interface Port License. Please refer to the DeltaV Serial Interface product data sheet for details. DeltaV Serial Interface Port License, VE4102 (1 per 16 datasets required).Not required for v9.3 or higher.

4. Requires DeltaV v6.1 or later software on Windows Workstation configured as a DeltaV ProPlus.

| Item | Description |
|---|---|
| **Hardware Module** | |
| MIM-4207 | DeltaV Virtual I/O Module |
| VIM-4201 | DeltaV Virtual I/O Module for Redundant Installations |
| **Software Licenses** | |
| IOD-4101 | Modbus TCP/IP Master Driver for DeltaV VIM |
| IOD-4102 | Ethernet/IP Scanner Driver for DeltaV VIM |
| IOD-4104 | Generic Device Ethernet / IP Scanner Driver for DeltaV VIM |

### DeltaV Software Licensing Requirements

- In general, DeltaV Module configuration will impact the required DST License more than the serial card driver type and configuration. The following guidelines can be applied:
  A DeltaV Serial Module data set can contain up to 100 values (a value can be any boolean, 8-bit or 16-bit number), and up to16 data sets are supported by each of the 2 ports on the serial card. If the data set registers are configured as floating point or 32-bit values, then the maximum values is 50. However, the serial device, in general, limits the total capacity of the interface.
- Each data set counts as one DST as long as a single module references all values in the data set. If multiple modules reference values in a data set, then the DST count for the data set is equal to the number of modules referencing the data set.
- Values used in modules containing control function blocks will be counted as Control DSTs.
- Values referenced only in graphics or a history collection count as SCADA values, not DSTs.

## HOW TO CONTACT US:

For more information about MYNAH's VIM, please contact us at:

**MYNAH Technologies**
504 Trade Center Blvd.
St. Louis, Missouri 63005 USA
1.888.506.9624 (North America)
+1.636.681.1555 (International)
+1.636.681.1660 (Fax)
Email: mailto:support@mynah.com
http://www.mynah..com/vim