

# Ethernet I/O Card



*The Ethernet IO Card provides a high speed Ethernet IO device integration platform*

- Easy to use
- Powerful integration solution
- Modular, flexible packaging

## Introduction

The DeltaV S-Series Ethernet IO Card (EIOC) provides an interface to Industrial Ethernet networks and devices that use the Modbus TCP/IP or Ethernet/IP protocols. DeltaV S-Series controllers can read and write signals from plant floor devices connected to Industrial Ethernet networks such as PLC's, Motor Control Centers, and Weigh Scales.

## Benefits

**Easy to use.** The EIOC is easy to use and well integrated into the DeltaV system. Specific ease of use features include:

- **Seamless IO integration.** Each EIOC is seen by the DeltaV S-Series controller as up to four DeltaV Serial Cards. Commissioned EIOCs are auto-sensed by the DeltaV controller as DeltaV Serial Cards.
- **Configured in DeltaV Explorer.** Serial dataset configuration is done in the DeltaV Explorer in the same manner as a DeltaV Serial Card. IO signals can be used in DeltaV Control Modules and displayed on DeltaV Operate graphics.
- **Intuitive setup.** The VIMNet Explorer utility is used to configure the plant Ethernet network. Graphical, drag-and-drop functionality makes setting up the plant Ethernet network quick and easy. VIMNet Explorer is integrated with DeltaV Explorer to make setup of the EIOC easy and intuitive.

**Powerful integration solution.** Use the EIOC to integrate your DeltaV system with your Industrial Ethernet network networks.

- **Large device capacity.** Each EIOC can emulate up to 4 DeltaV Serial Cards and support up to 128 Serial Card Datasets of information from 32 network devices in simplex installations and 16 devices in redundant installations. Communication over the plant Ethernet network is fast and efficient.
- **Flexible networking.** User configurable IP addressing allows the EIOC to be used in almost any plant environment regardless of networking scheme. The EIOC and the plant Ethernet devices must be on the same IP subnet to communicate.
- **1:1 Redundancy.** Redundancy can be added to any system by adding a second EIOC and configuring the two cards as a redundant pair. The EIOC appears as up to 4 Redundant DeltaV Serial Card pairs. 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 packaging.** The EIOC mounts in the same manner as the DeltaV controller. It mounts in the controller slot of a DeltaV 2-wide horizontal or 4-wide vertical carrier and uses a standard DeltaV Power Supply. The advanced design of the EIOC will provide years of uninterrupted use.



EIOC and power supply

### Product Description

The EIOC 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 EIOC 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.

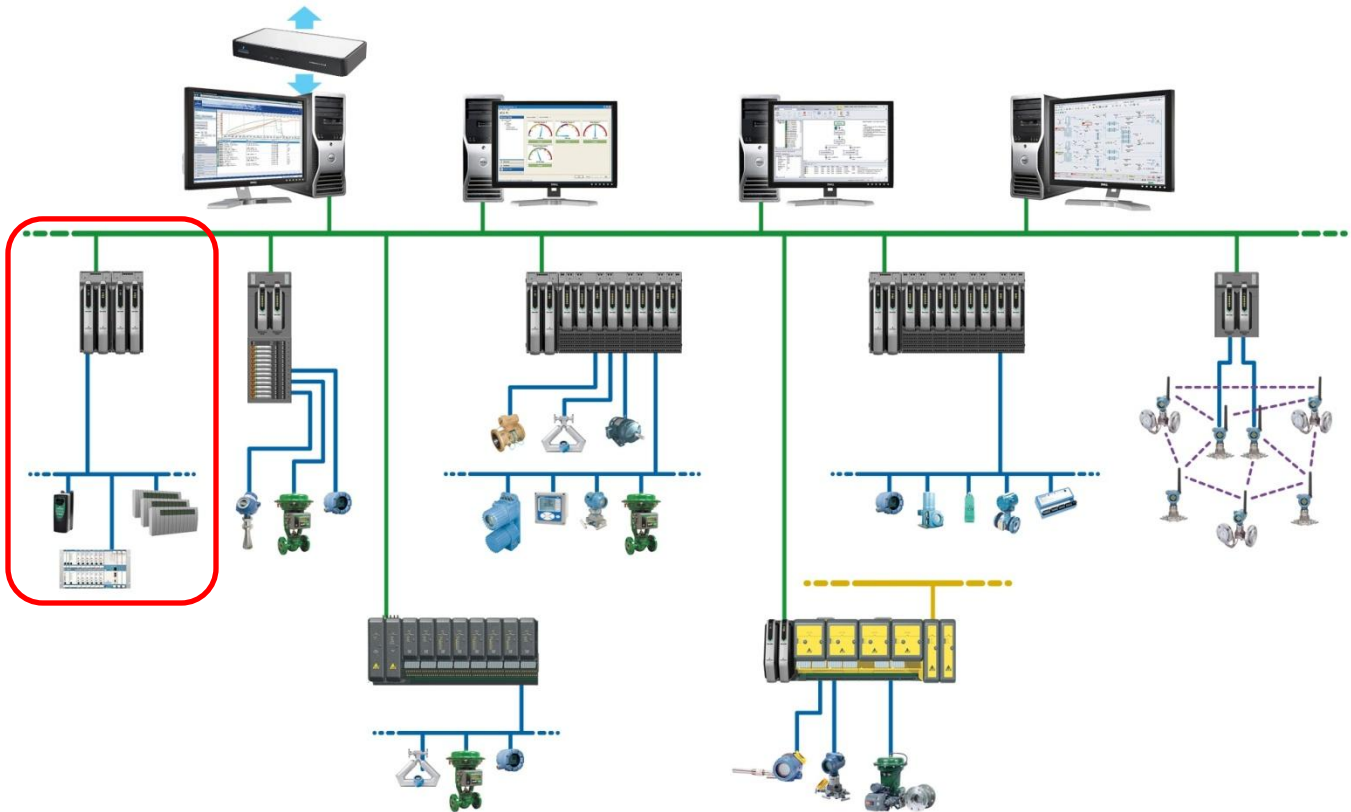
Configuration of the IO signals from the commissioned EIOC is done in the DeltaV Explorer in the same manner as a DeltaV Serial card.

**VIMNet Explorer.** The VIMNet Explorer utility allows the user to commission the EIOC, setup primary and redundant EIOCs, and the Industrial Ethernet Network. The user is able to specify the IP address, Subnet Mask, and Gateway of each EIOC and set the node address and

names of each Plant Ethernet Network device that is used by the EIOC. The VIMNet Explorer runs on the MS Windows XP or Windows 7 operating system and has an intuitive, graphical user interface. Connection to the EIOC is done through the Module RJ-45 Ethernet Connection.

**Module Redundancy.** Two EIOCs can be setup as a redundant pair for installation that require backup plant networks. Each EIOC will be installed on its own 2-wide carrier, with its own power supply to the left of the DeltaV Controller.

The active and standby EIOCs monitor each other with a continuous status command using the redundancy link cable supplied with each redundant pair. The active EIOC communicates over the network to the Industrial Ethernet device and the standby sends an intermittent signal to the device to maintain communication integrity.



EIOC integrated into the DeltaV system (simplex EIOC shown)

## Supported Industrial Ethernet Protocols

**Modbus TCP/IP** The EIOC 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 EIOC Modbus TCP/IP Driver supports the following Modbus function codes:

- 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 EIOC 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 EIOC 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 EIOC 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

## DeltaV Licensing Guidelines

DeltaV Software Licensing Requirements (DST count) will be impacted by DeltaV Module configuration use of EIOC registers in the same way as Serial Card registers. The following guidelines can be applied:

- A DeltaV Serial Card data set can contain up to 100 values (a value can be any boolean, 8-bit or 16-bit number), and up to 16 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.

## Hardware Specifications

Specifications for the Ethernet IO Card	
Power requirement	Supplied by System Power Supply through 2-wide Power/Controller Carrier
Maximum current	750 mA at 5 VDC
Fuse protection (internal)	3.0 A, non-replaceable fuses
Power dissipation	4.0 W typical, 5.4 W maximum
User Memory	16 MB
Mounting	On right slot of power/controller carrier OR vertical carrier
Size dimensions	4.1 cm w x 15.9 cm h x 10.7 cm d
Weight	278 grams
Environmental specifications:	
Operating temperature	0° to 60° C (-40° 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 (normal operating conditions)	10 g ½-sine wave for 11 ms
Vibration (operative limit)	1 mm peak-to-peak from 5 Hz to 16 Hz, 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 EIOC is commissioned and active.
Green – Standby	Not used.
Yellow flashing – Network	Indicates valid network communication.
Yellow, flashing – Ctrl IO	Indicates valid DeltaV IO Bus communication.
All except Power flashing, alternating even and odd	Visual ID of controller initiated from user interface software by ping command
External connections:	
Plant Ethernet Network	One 10BaseT 8-pin RJ-45 connector
Redundancy Link	One RJ-11 Serial Connection (cable supplied with redundant modules)
Capacity:	
Emulated DeltaV Serial Cards	4
Data sets per EIOC	128
TCP/IP Master/Slave or Adapter Nodes per EIOC	Redundant mode: 16 slaves only Simplex mode: 32 slaves Simplex mode mix: 16 slaves and 16 masters

## **Certifications**

The following certifications are available on the S-series Ethernet I/O card.

■ **CE:**

- EMC- EN 61326-1:2006
- LVD- EN 61010-1:2001

■ **CSA:**

- CLASS 2252 05 - PROCESS CONTROL EQUIPMENT:

CAN/CSA-C22.2 No. 0-M91 General Requirements-  
Canadian Electrical Code, Part II

CAN/CSA-C22.2 No. 61010-1-04 Safety  
Requirements for Electrical Equipment for  
Measurement, Control, and Laboratory Use,  
Part 1: General Requirements

Ordering Information

Description	Model Number
Ethernet IO Card	SE4023

Related 3<sup>rd</sup> Party Products

- **Ethernet IO Drivers.** The EIOC requires the appropriate driver provided by Mynah Technologies. The available drivers are as follows:
  - Modbus TCP/IP Master Driver (IOD-4101)
  - Ethernet/IP Scanner Driver (IOD-4102)
  - Generic Device Ethernet/IP Scanner Driver (IOD-4104)

Please refer to the Mynah Web site [www.mynah.com](http://www.mynah.com) for details.
- **VIMNet Explorer.** Used to configure the Plant Ethernet Network and commission the EIOC. Provided with the DeltaV v11 and later software.

Prerequisites

- A power controller carrier. Please refer to the S-series Horizontal Carriers product data sheet for details.
- A dedicated system power supply. Please refer to the S-series Power Supplies product data sheet for details.
- An Ethernet IO driver provided by Mynah Technologies.
- DeltaV v11 or later software.

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