

# S-series Sequence of Events Card



*DeltaV™ Sequence of Events delivers high-resolution data capture for your easy analysis.*

- Captures process upset events close to the source for precise recording
- Provides increased resolution of timestamps for more accurate event sequencing
- Easily integrates data with desktop applications for detailed analysis and reporting

## Introduction

When a process upset occurs, events can take place very rapidly throughout your process area. In order to correctly determine the cause of the upset, accurate recording and sequencing of the events is essential.

DeltaV™ Sequence of Events provides a means of recording the events associated with a process upset, and using highly accurate time stamps to determine the precise order in which they occurred.



## Benefits

**Captures process-upset events close to the source for precise recording.** Sequence of Events (SOE) input cards are used to capture process-upset events coming directly from devices in the field. The card independently samples each input every 0.25 ms to provide precise time stamps of significant transitions of these inputs. These events are then directly communicated to the Sequence of Event database.

**Provides increased resolution of timestamps for more accurate event sequencing.** Events captured by an SOE input card are time stamped using a ¼-millisecond resolution. The SOE cards on the same controller are resolved by the DeltaV controller to ensure accuracy across the DeltaV network.

Using a Network Time Protocol (NTP) server, DeltaV controllers are synchronized across the entire network to within +/- three milliseconds. The NTP server uses the Global Positioning System satellites for an accurate time reference. As the controller reads events, they are time stamped using the NTP server as a reference. This method of synchronization, along with the increased resolution, provides a much more accurate and complete picture of the order in which the events occurred.

**Easily integrates data with desktop applications for detailed analysis and reporting.** The Event Chronicle stores SOE messages electronically, so that you always have *easy, reliable access* to the data. A single Event Chronicle can capture system events spanning multiple controllers and workstations, so that you can look in one place to find all the relevant data. Additionally, multiple Event Chronicles can reside on the same DeltaV network for redundant event capturing

The events stored in the Event Chronicle can be easily viewed using the *Process History View* application, which displays the events in chronological order.

The Event Chronicle can *automatically export* data as well, so that it can be read using other software packages such as the standard Microsoft Office applications.

## Product Description

The DeltaV system is designed to capture and time stamp the events as close to the source as possible, providing you with a much more *accurate picture of the sequence of events* as they occurred. Typical process events are captured in control modules and are time stamped when the modules execute. For more critical process signals, the SOE card allows those discrete events to be recorded at the input channel, with time stamp accuracy better than 5 ms across the entire control system.

The DeltaV system receives process-upset signals using the Sequence of Events input card. This card has 16 discrete input channels and each channel can be configured as either a standard discrete input or SOE input. The SOE input signals can be used just like standard discrete inputs as part of any control strategy.

Each card is capable of buffering a maximum of 32 events. These events are communicated to the controller where the time stamp is resolved using the NTP Server to ensure accuracy. The controller then passes each time-stamped event to the workstation where it is logged into the Event Chronicle SOE database. Once the controller receives confirmation from the workstation that an event has been logged, the event is cleared from the card's buffer.

The Event Chronicle receives these events and displays them using *Process History View*. Since the events are time stamped in the DeltaV Controller, multiple Event Chronicles will always have consistent timestamps, eliminating the possibility of variance due to differences between the workstations' system clocks.

You can also set up automatic exports of SOE records. The export file format is simple delimited text format, so that it is easily accessible by most desktop applications (such as Microsoft Access or Excel) for further use or analysis.

To address the needs of *125 VDC* often found in the Power Industry, a termination assembly to condition those signals is available. The DeltaV SOE interface with the Mass Termination block connector is used with plug on signal conditioners. It is detailed in the Related Products section below

<b>Specifications for the Sequence of Events Card</b>	
Number of channels	16 Each channel can be configured for DI or SOE operation
Time stamp accuracy	0.25 msec on a card; 1 msec in a controller. Accuracy with reference to system clock time after a 4 msec debounce filter has been applied.
Scan rate	0.25 msec. for all 16 channels
Isolation	Each channel is optically isolated from the system and factory tested to 1500 VDC.
Detection level for On	> 2 mA
Detection level for Off	< 0.25 mA
Input impedance	5K ohm (approximate)
LocalBus current (12 VDC nominal) per card	50 mA typical, 75 mA maximum
Field circuit power, per card	75 mA at 24 VDC ( $\pm 10\%$ )
Field circuit voltage	24 VDC
Terminal block	32-screw termination block or 40-pin mass termination block
<b>Environmental specifications</b>	
Operating temperature	-40° 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 G3 Conformal coating
Shock (normal operating conditions)	10 g ½-sine wave for 11 ms
Vibration (operative limit)	1 mm peak-to-peak from 5 Hz to 13.2 Hz, 0.7 g from 13.2 Hz to 150 Hz

### System Compatibility

- Network time protocol server is required if SOE cards are installed in more than one controller. Contact your local Emerson Process Management representative for more information on the NTP server approved for use with the DeltaV system.

### Certifications

The following certifications are available on all S-series Sequence of Event 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

Complies with NAMUR NE21 per DeltaV Digital Automation System NAMUR NE21 Installation Instructions 12P2822.

The following certifications have been submitted for Hazardous Locations and for Marine applications. Please verify with the appropriate certifying agency for a specific list of approved components

- **CENELEC Zone 2 ATEX/IEC EX**

EN 60079-15:2005  
Certifying agency: Nemko  
Certificate Number: TBD

Refer to document TBD  
*"DeltaV™ Scalable Process System Zone 2 Installation Instructions"*

- **FM Approval**

**Class 1 Division 2 Hazardous Locations**

Certifying agency: FM Approvals  
Certificate Number: TBD

Refer to document TBD  
*"DeltaV™ Scalable Process System Class 1 Division 2 installation Instructions"*

- **Marine Certifications:**

IACS E10:2006 Rev.5 Control, protection & Safety

- ABS Certificate of Design Assessment
- Bureau Veritas Certificate
- DNV Marine Certificate
- Lloyds Register

- **GOST Hazardous Area certification Zone 2 (Russian)**

Other country specific certifications may also be available. Verify with your local Emerson sales office to confirm any certification requirements not listed here.

Ordering Information

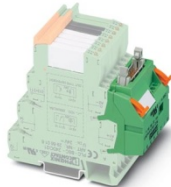
Description	Model Number
SOE interface with 32-screw termination block	SE4001S5T2B4
SOE interface with Mass term block Connector	SE4001S5T2B5

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

125 Volt Termination Assembly



Terminal Assembly Base



Cable

8 channel Interface

125 Volt Termination Assembly, as well as other Termination products available from Phoenix Contact, can be found under <http://www.phoenixcontact.net/microsites/emerson/Termination%20Boards%20DI.htm>

Description	Phoenix Contact Part Number
Terminal Assembly base terminal block with Optical Coupler - one per point	Part Number 2980050 Part Type PLC-OSC-125DC/24DC/2
8 Channel Interface Module - needed for each 8 points	Part Number 2304115 Part Type PLC-V8/FLK14/IN/M
1.0 Meter Cable with Connectors for DeltaV SOE Mass Term Block and Phoenix 8 channel Connector - one for each Interface module – up to 2 per SOE card	Part Number 2304791 Part Type FLK 14/20/EZ-DR/100/DV/SOE
2.0 Meter Cable with Connectors for DeltaV SOE Mass Term Block and Phoenix 8 channel Connector - one for each Interface module – up to 2 per SOE card	Part Number 2304801 Part Type FLK 14/20/EZ-DR/200/DV/SOE
3.0 Meter Cable with Connectors for DeltaV SOE Mass Term Block and Phoenix 8 channel Connector - one for each Interface module – up to 2 per SOE card	Part Number 2304814 Part Type FLK 14/20/EZ-DR/300/DV/SOE

To locate a sales office near you, visit our website at:

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+1 512.832.3774

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DELTA V

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