



Maxiflex – Sequence of Events Recording System

DATASHEET

FEATURES

- Up to 480 Digital Points per Rack(15 SOE modules)
- Up to 1440 Digital Points per System(3 Racks of 15 SOE Modules)
- 200 micro second input discrimination
- 1 millisecond time-stamping on events as standard
- 1000 Event Buffer on each Mx SOE module
- Capability of Integrating Analogue Signals
- Integrated Serial Annunciator Display Options
- Distributed Network Options
- Redundant Communications Controller Options
- Integration to OMNI4000 Alarm and Events Management Supervisory software

The Maxiflex SOE(Sequence of Events) System is a sequential events recording system and integrates with Omni4000 PC based Alarm management supervisory HMI stations or any OPC compliant SCADA. Up to 1440 Digital Inputs may be monitored for change of state with 200micro second discrimination between inputs. Events are sorted and logged to 1 milli-second resolution and the event stream is transmitted via LAN to the HMI.



General Description

The Maxiflex SOE (Sequence of Events) system comprises Maxiflex Modules for the I/O front end and Conet Classic(Twisted Pair) or Conet/e (Ethernet) LAN connections to HMI supervisory systems for recording of events. It is designed to work with Omniflex's Omni-4000 PC-based alarm management package (up to 4 per network) and other SCADA systems as well through the use of Conet OPC servers.

System Hardware

The SOE System comprises standard Maxiflex 1000 series RTU modules with special software loaded into the CPU module. The system consists of bases with plug-in power supplies, CPUs, Digital Input SOE modules (alarm inputs), Analogue Input Modules optional. Any of the Maxiflex bases can be used for the system depending on the overall system size. This allows from 2 to 15 I/O modules per node, in combinations with Master and Expander bases.

Power Supplies

The PSUs can be 24 V dc or 110/220 V ac powered. One version of ac PSU has a built-in battery charger which uses an external battery (sealed lead-acid). Battery size determines backup time.

CPUs

The system uses M126X CPUs (standard P3 CPU with built-in Conet fieldbus or Conet/e Ethernet local area network). Any software is downloaded into the CPU via its programming port via any RS232 port on a PC. Configuration (customization) of the system is also done via the programming port from the PC using Omniset Pro configuration management software. The CPU performs all the I/O scanning, network communications, time-stamp sorting and alarm annunciation functionality if utilised.

Input Modules

The Maxiflex M1760 or M1761 SOE accepts 32 Channel Dry contacts from the field via a special termination board C6332A and an Interface cable with DB37 Connectors making a simple plug in connection at the SOE module. The Mx SOE module supplies a nominal 24V dc(0-30Vdc) or 48 V dc(30-60Vdc) wetting potential to the field (alarm inputs) and times stamps the changes of state in order of occurrence (200 micro second discrimination). The Mx SOE module passes these

to the CPU as an event queue with a 1millisecond resolution. Each Maxiflex SOE module has an event buffer of 1000 events ensuring that under avalanche trip conditions the Mx SOE module can service and capture the incoming changes of state. Leds on the front fascia indicate the input status. The modules can be plugged into the base in any order or position.

The Maxiflex 32SOE Field Input Cable(C1467) with DB37 Male on one end and DB37 Female on the other, connects Maxiflex 32SOE module to C6332 Terminal Board. C1467-2 (2 metre length) is standard. Other lengths made to order

Analogue Input Modules (Optional)

Analogue Inputs can be integrated into the SOE system. Temperature inputs like Thermocouples and RTD as well as 4-20mA signals can be connected. Each Analogue Input has 4 setpoints which can be configured as inputs to the SOE system.

Alarm Fascias (Optional)

The Maxiflex SOE system can interface to a serial alarm fascia (if the option to use M1580A Dual Serial NIM's is exercised, this sacrifices 32 Inputs from the system). Three types of Omniflex serial alarm fascias exist , all panel mount 8Pt (Omni8), 10Pt (Omni10) 16-point alarm fascia (Omni-16). See relevant datasheets for the serial annunciators.

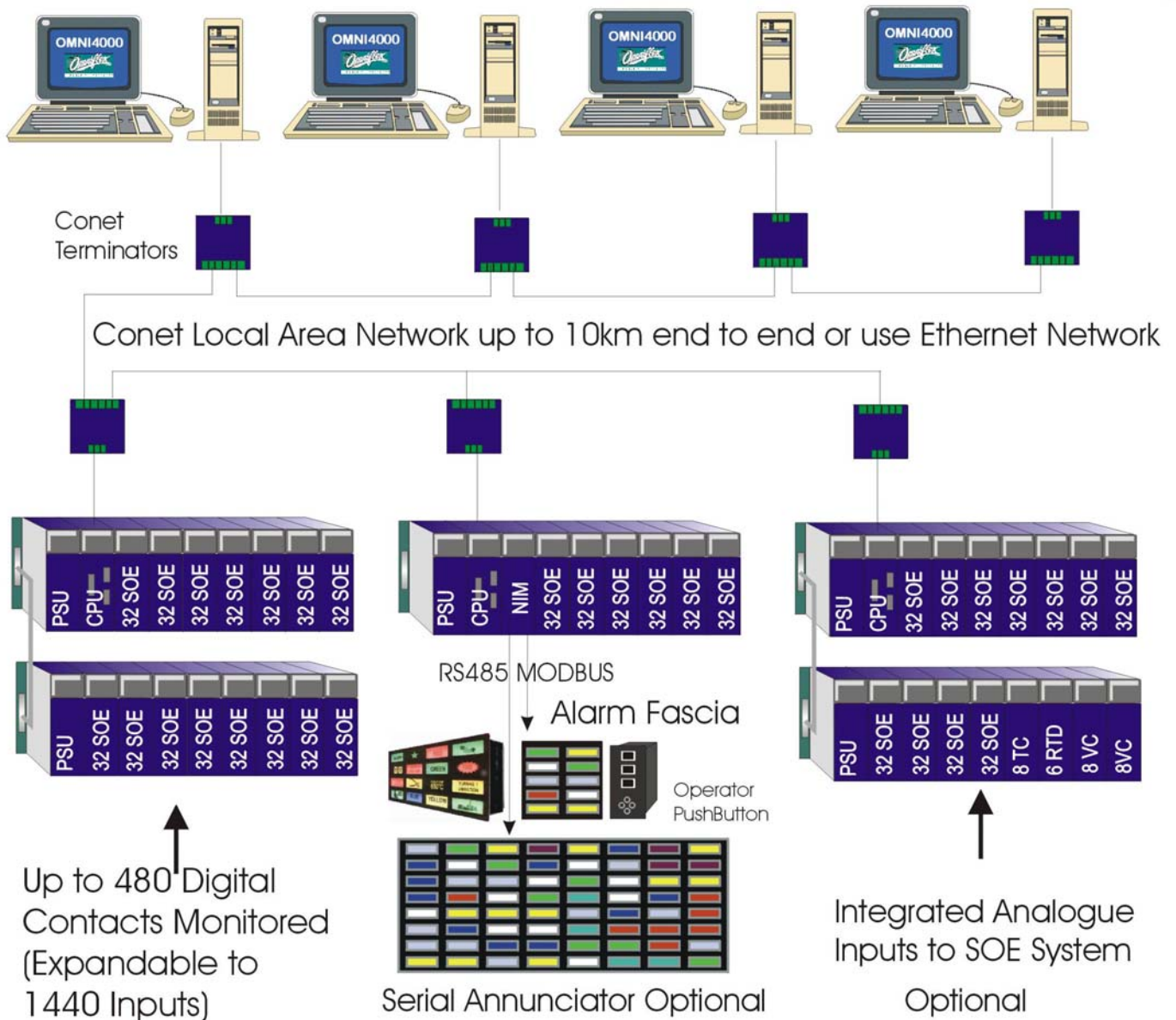
Local Area Network

The Maxiflex P3 CPU (M161X) has a built-in Conet Classic fieldbus local area network or a Conet/e Ethernet TCP/IP for communications between nodes and the Omni-4000 alarm management system (and/or other SCADA system). Conet Classic is designed for industrial data communications with each node fully isolated (1500 Vrms) from the line. A Conet field termination board (Model No. C6169), fitted with gas discharge devices, is located at each node to suppress high voltage spikes associated with lightning strikes and other noise. The Conet/e Ethernet network uses a standard 10/100 MB RJ45 UTP Ethernet connection which can be used on a plant backbone or as is recommended a dedicated Ethernet link to the Supervisory system (Omni4000 or SCADA). A dedicated link is recommended so as to ensure there are no traffic related issues in streaming events to the supervisory system.



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Omni-4000 Alarm Stations provide comprehensive alarm management capability with time stamped data, alarm list, quick fault analysis, custom reporting



Software Setup

Configuration is done using a PC, connected to each CPUs programming port. All of the Maxiflex SOE parameters can be modified while on-line. The Data Interchange Table (DIT) in the CPU is used to store all program parameters and can be viewed remotely across the Conet network at any time using Omniset Pro an Omniflex configuration management software utility.

Time Stamping

All inputs are time stamped to 1 ms resolution as they occur in the front-end. These events are queued on the SOE Module and the CPU at that node and then transmitted to the relevant Omni-4000 master station. If the Omni-4000 master station is off-line (for whatever reason), the events may be configured to transmit to the next (and subsequent) stations as configured. If no supervisory system is available the SOE module can be configured to save the latest 1000 events or the first 1000 events ie if necessary overwrite the queue buffer locally or stop logging when full. All Maxiflex nodes on the network are time synchronized over the network. This ensures correct time stamping.

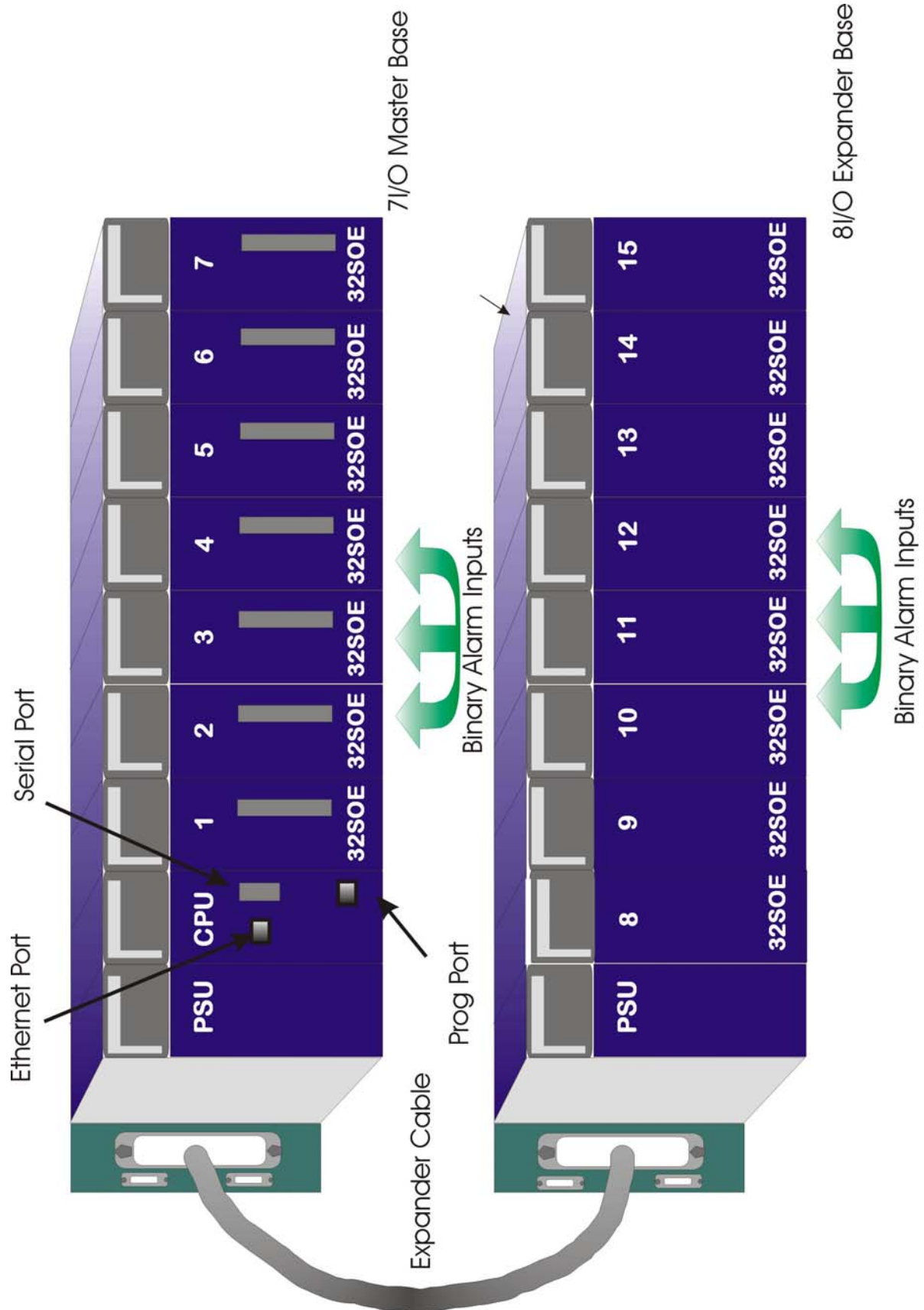
Time Synchronisation

Time synchronisation is done from a time sync master in the system this can be configured to be a Maxiflex CPU or the PC based Omni4000 or SCADA. In each case the Conet OPC server will provide the broadcast time sync command to all the Maxiflex devices connected to it. This means that the typical situation where an external master time sync system is used for the entire plant then the PC is updated according by the external master and thus the OPC server will broadcast updates for the Maxiflex SOE system.



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Typical Maxiflex system with full compliment of SOE modules





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Node Specifications

Power Supplies for Powering the Maxiflex bases

Model No.	Description
M1102	24 V dc Input + Logic Power Supply
M1151	Mains Input + Logic + Field Power Supply
M1152	Mains Input + Logic + Charger

Alarm Inputs

Quantity : Up to 480 Digital max per Standard Maxiflex Node*
 * Expandable to 1440 Digitals using remote I/O rack system. i.e. 3 by 15 Module systems using Maxiflex Remote I/O controllers to expand off a single CPU node.

Module Type M1760

Input Type
 32 x Wetted inputs; 24V dc *
 9-30V dc Guaranteed On Voltage**

Input Current over Voltage Range
 Off Voltage <4V Guaranteed Off
 Off Current <0.3mA

M1761

32 x Wetted inputs; 48V dc *
 30-60V dc Guaranteed On Voltage**

Input Current over Voltage Range
 Off Voltage <8V Guaranteed Off
 Off Current <0.3mA

*Internally Sourced by SOE Module

** Field Wetted Contacts External Power Supply

Input Sensing : N/O or N/C per input
De-bounce filter : Select 1ms or 4ms (Hardware)
Into alarm delay : Variable from 0 to 65 530 ms per input

Return to normal delay : Variable from 0 to 65 530 ms per input

Inhibit (shelving) Chatter Filter : Per input
 : Selectable Chatter Filter that detect input chatter preventing filling buffers

Module indications : 1 Green LED per input on module

Time tagging : Each input change of state tagged to 1ms

Isolation : 2500Vac 50/60Hz for 60 sec
 100% tested

Insulation Resistance : 1000MΩ min @ 500Vdc

Input Terminations
Quantity : Up to 32 per Input Termination Board

Module Type **Output Type**
 C6332A 32 inputs via Terminals to DB 37 Connector.
 Terminal Size Up to 2.0mm²
 Terminals per Input 2

Aux Terminals Terminal Common
 Module Common
 Screen

Serial Annunciator Output (Optional)

Quantity : Up to 480 Points via Modbus RS485

Module Required

Type **Output Type**
 M1580 Dual Serial Network Interface Module RS485
Capacity 32 to 64 Modbus Slaves (Annunciators)
Purpose : Fascia displays (LED or lamp)
States : Full 27 Alarm Sequence

Annunciators with Operator intervention push button stations for Sil, Ack, Reset, Test

Analogue Inputs (Optional)

Quantity : Sacrifices SOE module for Analogue Modules
Operation Each Analogue Input Module has 4 Setpoints per Channel which can be integrated into the sequence of events system.
 Maximum per Node

Thermocouple Input 120*
RTD Input 90*
Volts or Current Input 120*

*Assumed a full rack of Analogue Modules no SOE modules

Module Type **Output Type**
 M1431 8 Channel ISO VC Input module
 M1432 8 Channel ISO TC Input module
 M1433 6 Channel ISO RTD Input module

Alarm Output Queue

Number of events in queue : Up to 1000 per 32 Channel SOE Module
Storage per event : Input number, Input state (Alarm, Normal), Year, Month, Date, Hrs, Mins, Secs, ms, DIT number, BIT number

Priority : On Change of state

Number of queue IDs : 4
Master queue ID : Set for one Master Station
Auxiliary queue ID : One auxiliary station
Queue full handler : Default

First events in remain there until network communications re-established. Last events into full queue do not get accepted.
 Or
 Most recent event can overwrite the oldest. User selection

Queue routing : Automatic re-routing to alternative Master Station if communications to main Master Station broken

Transmit type : Polled by master – OPC server
Master fail detect : 3 communication attempts
Master retry interval : Approximately 20 s

Network communications

Network type : Conet fieldbus LAN
Number of nodes : 127 (including PCs)
Speed : 62 500 baud, switchable to 7812 baud

Isolation : 1500 V_{rms} at each node

Distance : Up to 10 km

Medium : Shielded twisted pair

Termination : Uses 1 x C6169 field termination board at each node

CPU connection : Subminiature DB-9 connector

Indicators : Tx, Rx and Token LEDs
 Fault indication with all 3 on steady

Network type : Conet/e Ethernet LAN

Number of nodes : 127 (including PCs)

Speed : 10/100Mbps/sec

Isolation : 1500 V_{rms} at each node



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Distance Medium Termination	: Limits of Ethernet Backbone : UTP via RJ 45 Connector at CPU : Nil Intended connector to Ethernet Hub
CPU connection	: RJ 45 connector
Indicators	: Link, 100Mbps LEDs,
Programming Functions	: Downloading application program and configuration parameters from PC
Connector or CPU Programming cable	: FCC-68 socket : Supplied as standard RS232 (DB-9) to FCC-68, 2m
Programmer	: Any IBM/PC compatible
Conet time synchronization	
Note:	this only applies to Omni-4000 systems with OPC server.
Method	: Conet broadcast message on network
Source	: Omni-4000 master (PC Clock)
Update time	: Every 30 seconds

Environmental

Operating temperature	: -25 °C to +60 °C (-13 °F to +140 °F)
Storage temperature	: -40 °C to +70 °C (-40 °F to +158 °F)
Humidity	: 5 % to 95 % at 40 °C (104°F) (non-condensing)
Vibration	: 10 Hz - 150 Hz, 1 G (9,8/s ²)
Safety	EN60950:1995
Emissions	EN 55011:EN50081-2:1994 Group 1 Class A; EN50082-2
Immunity ESD	IEC 61000-4-2:1995 Level 3
Immuniity RF Fields	IEC 61000-4-3:1995 Level 3
Immnuity Fast Transients	IEC 61000-4-4:1995 1kV – input/output lines
Protection	Electronics conformally coated

Overall Specifications

Maxiflex Items used

Model No.	Description
Bases	
M1001	Maxiflex 2 I/O Master Base (Not expandable)
M1021	3 I/O Master Base (Expandable)
M1023	5 I/O Master Base (Expandable)
M1031	5 I/O Expander Base (no PSU required)
M1022	7 I/O Master Base (Expandable)
M1032	8 I/O Expander Base (PSU required)
Power Supplies	
M1102	24 V dc Input + Logic Power Supply
M1151	Mains Input + Logic + Field Power Supply
M1152	Mains Input + Logic + Charger Power Supply
M1154	Mains Input + Field Power Supply
CPUs and I/O Scanners	
M1248	R2c Redundant I/O Scanner Conet port
M1261	P3 CPU Conet/c Port
M1262	P3 CPU Conet/e Port
M1267	P3e Redundant Link Controller
Input Modules	
M1760	32 SOE Sequence of Events Module 9-30Vdc
M1761	32 SOE Sequence of Events Module 30-60Vdc
M1431	8 Channel ISO VC Input module
M1432	8 Channel ISO TC Input module
M1433	6 Channel ISO RTD Input module
CC0	Omni4000 software (Windows)