

MAXILARM

Distributed
Alarm & Event
Management



PROFILE

Corporate Overview



a trusted name
in automation
and control

OMNIFLEX has been designing and manufacturing electronic products and systems for the automation and control industry since 1965.

Through our world-wide partner network, we specialise in providing solutions to industry in the fields of Alarm and Event Management, Remote I/O, RTU's Data Acquisition and Process Signal Conditioning Systems.

More than three decades of experience in innovating products and systems such as these have resulted in a refined range of solutions for managing abnormal and critical events in industrial processes. These proven solutions are being relied upon every hour of every day by major corporations around the world.

MAXILARM is one such system. Originally released in 1987, the MAXILARM and companion Omni4000 products have been monitoring critical alarms for decades.

Ongoing innovation has seen this range continually evolve, and the current MAXILARM system offers leading state-of-the-art alarm and event management solutions.

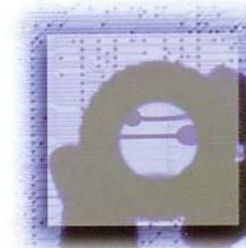
Whether it is four points or four thousand points, there is an OMNIFLEX solution to you process alarm and event needs.

An investment in products that carry such a large responsibility requires confidence in our track record, and continued expansion of some of the world's giant industries using OMNIFLEX technologies is sufficient testimony to this support.

Don't ask us – ask our loyal customer base.

www.omniflex.com

*your link to reliable solutions in alarm and event
management.*



OVERVIEW

Distributed Alarm and Event Management

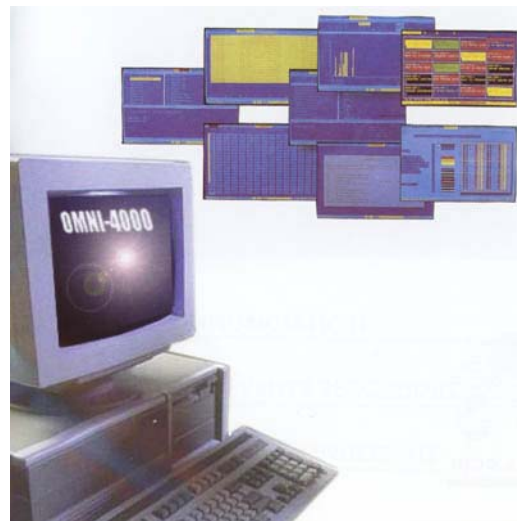
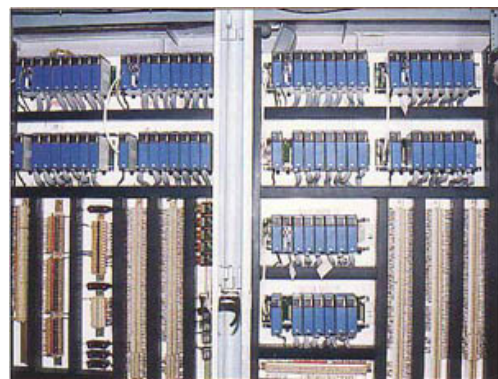


Maxilarm

The Maxilarm System offers a complete distributed alarm management function on critical plants. Incorporating features such as sub-millisecond time stamping at source, integrated analogue logging and remote alarm fascias all to meet EEMUA 191 guidelines, the Maxilarm system provides a dependable layer of plant protection and early diagnostics of fault transients in real time.

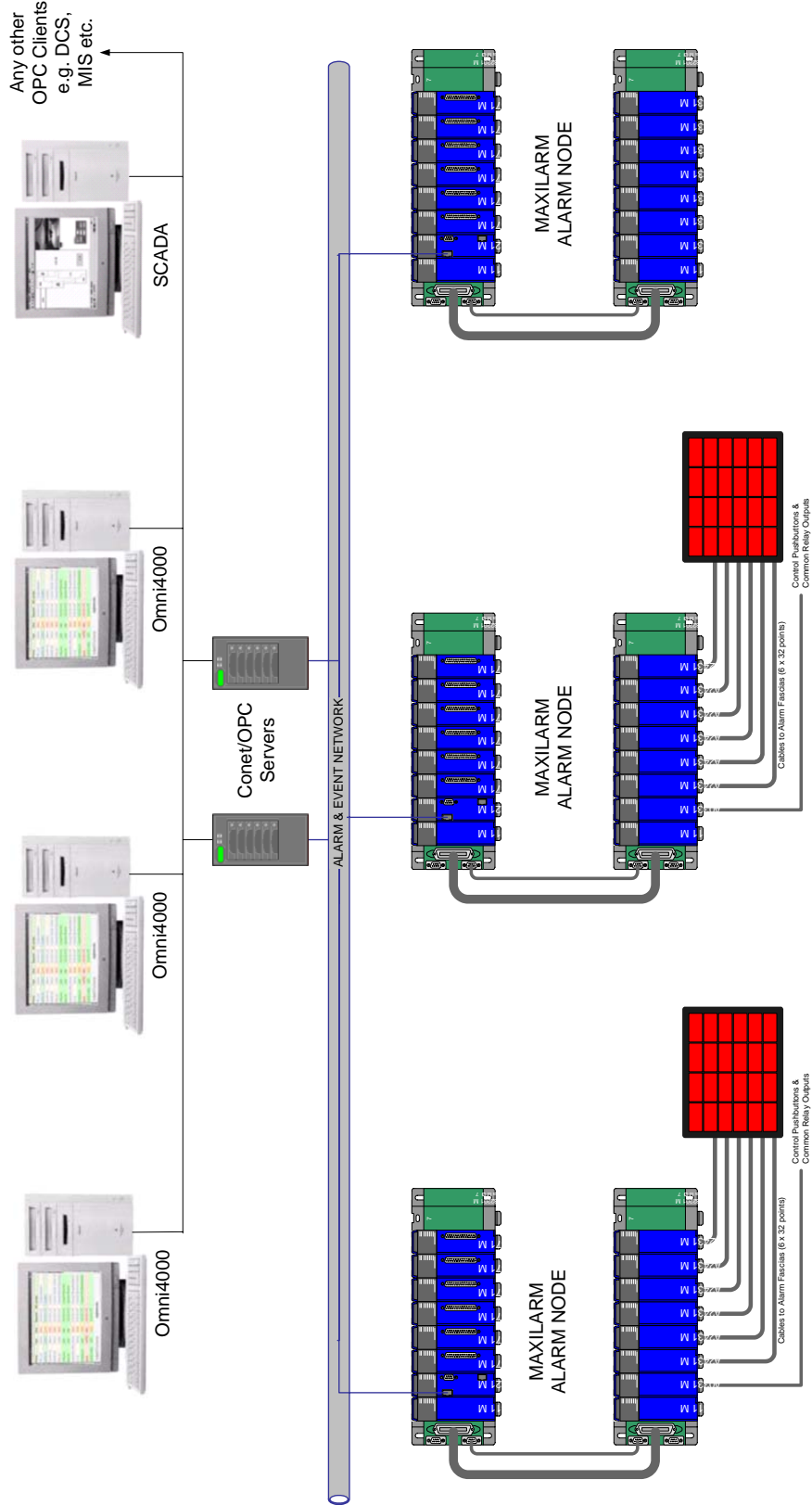
Features

- ✓ Up to 126 distributed alarm nodes
- ✓ Up to 240 Alarm Windows per node
- ✓ Up to 800 Event inputs per node
- ✓ Time-stamping at source to 1ms resolution.
- ✓ Sequence of Events resolution to 0.2ms
- ✓ Chatter filter for nuisance inputs stops queues clogging
- ✓ Spike filter prevents nuisance events
- ✓ Individual and Group Alarm Shelving
- ✓ Alarm shelving at source
- ✓ All controls can be local or remote
- ✓ Local Alarm fascias up to 144 windows each for fast operator response.
- ✓ Optional Redundant CPU's at each node
- ✓ Distributed Racks within each node provide efficient cable marshalling
- ✓ No software programming required to configure complex systems.
- ✓ IEC61131-3 programming capability for customised logic
- ✓ CSV exporting of alarm and event logs



SYSTEM

Typical System Architecture



TYPICAL MAXILARM SYSTEM ARCHITECTURE

ALARM NODE

The MAXIFLEX Advantage



MAXILARM

The **MAXILARM** Distributed Alarm and Event System (AES) alarm nodes are based upon OMNIFLEX field proven **MAXIFLEX** System

MAXIFLEX

MAXIFLEX is a state-of-the-art programmable automation controller (PAC) system with a wide range of modular I/O and networking capabilities

Unlike regular PLC's, the **MAXIFLEX** system is optimised to its core for handling more complex communications tasks and analogue I/O functions, and to streamline standard tasks such as Remote I/O configuration and diagnostics.

User Programmable in all the industry standard IEC61131-3 languages, the **MAXIFLEX** system can be tailored to suit the most demanding needs.

A range of purpose designed CPU modules is available for the **MAXILARM** AES (Model M1264A A3c, M1265A A3e, and M1266A A3e-R) that optimise the demanding functions of queuing fast events and handling synchronised flashing of large numbers of alarm fascias with no dependence upon conventional processor scan rates.

An advanced 32 channel Sequence-of-Events (32SOE) input module scans the I/O at 200 microsecond intervals for the fastest SER function in the industry. Each module provides front-end event filtering and queuing, removing the possibility of the main processor becoming overloaded in avalanche conditions.

A wide range of conventional I/O modules, power supply options, and communications ports complete the **MAXIFLEX** offering, providing a versatile platform for the most demanding Alarm and Event applications.



A 3I/O MAXIFLEX rack

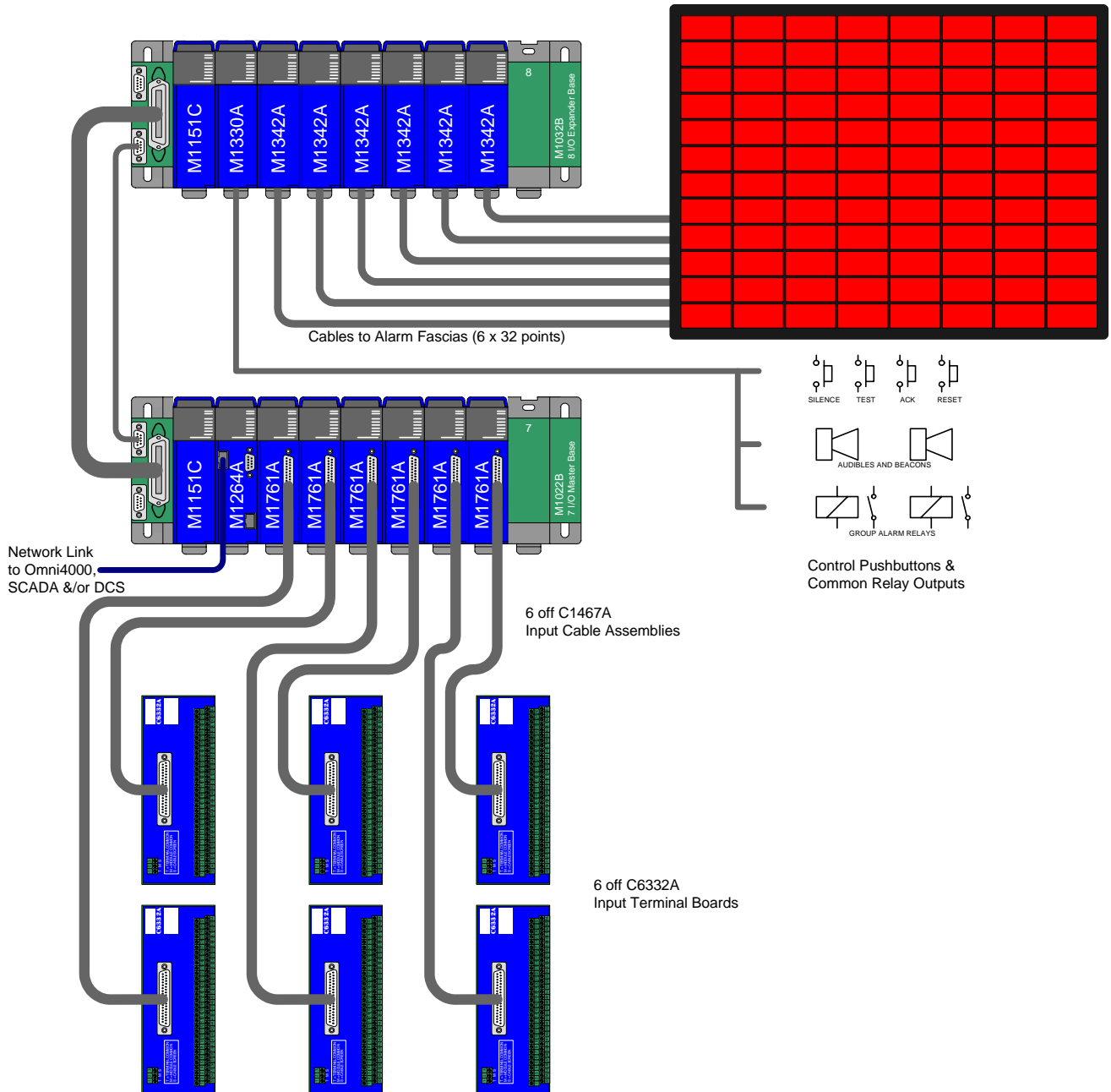


A MAXIFLEX dual redundant CPU system

MAXIFLEX - Intelligent Monitoring & Control

ALARM NODE

Typical Alarm Node Layout



192 Point Maxalarm Alarm Node
(Up to 126 nodes can be accommodated in a single system)

EVENTS

Time Stamp at Source

Event Management

At the heart of an effective alarm & event management system is the ability to handle avalanche conditions without losing events or losing track of time.

32SOE Module

The **MAXILARM** system uses a leading technology Sequence-of-Events architecture to meet these needs. At the core of this architecture is the advanced **MAXIFLEX 32SOE** module. This module scans its 32 inputs every 200 microseconds and queues any changes of state detected in a front-end queue within the module that can hold up to 9362 events.

Advanced Filtering

Ahead of the front-end queue in every 32SOE module is a sophisticated chatter and spike filter to ensure that, even under adverse conditions, only positive events are stored in the front end queue, and no queue clogging can occur.

Alarm Shelving

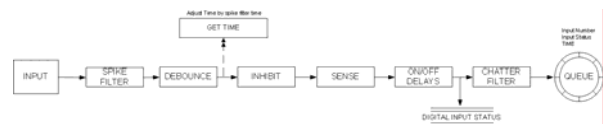
Any event in the system can be “shelved” by the operator for a specified finite time, or by another remote logic system. Shelved alarms are filtered out at the front-end of the 32SOE module preventing spurious events from even getting into the front end queue on each 32SOE module.

Time Stamp Correction

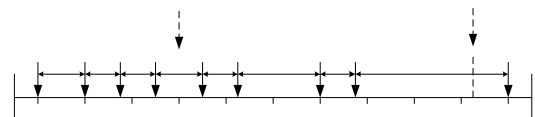
The time stamp on each input can be adjusted for delays in the electrical contact chain to ensure that the time stamp of the input is the actual time of the source event rather than just the time that the input was seen by the 32SOE module.



The advanced MAXIFLEX 32SOE Module and Terminal Board



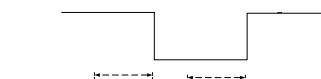
The 32SOE Event Flow Management



Chatter Filtering



De-bounce Filtering



On and Off Delay Timing



Signal Path Delay Compensation

The world's most advanced SOE function

ALARMS

Compliant Alarm Annunciation

Alarm Annunciation

Each **MAXILARM** alarm node is pre-programmed with a full function alarm annunciator. Up to 240 points of alarm annunciation can be configured with your choice of any of 27 pre-programmed alarm sequences, compliant with ISA-18.1 ISA SP18.02 and EEMUA 191. If none of these suit your needs, then you can configure your own.

Alarm Sequencing

The **MAXILARM** alarm annunciator function includes "First-Out" Alarm annunciator sequences. These alarm sequences are important for providing operators with the earliest possible indication of the root cause of failures, even in the face of a large number of cascading alarms.

Local and Remote Control

MAXILARM can be configured for control of alarm sequences from local pushbuttons or remotely from the central Omni4000 system, providing the most flexible operational requirements.

No programming Required

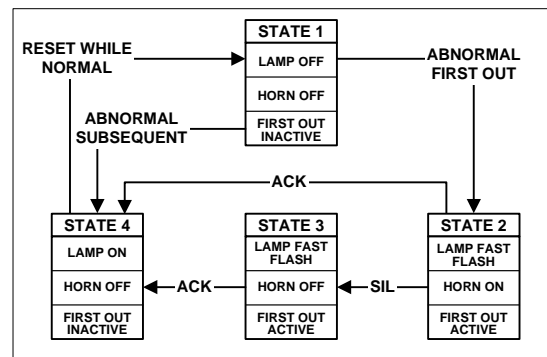
System software is notoriously difficult to qualify. By incorporating a full-function well-proven alarm annunciator, no software programming is required to configure the **MAXILARM** alarm and event functions. This increases the reliability and safety of these systems above bespoke programmable implementations.

Ask how **Silent Sentry** can add Text Message capability to send alarm messages direct to mobile phones.



PER MAXILARM ALARM NODE

- ✓ Up to 240 alarm points
- ✓ Up to 800 Event inputs
- ✓ Up to 32 control pushbuttons (Silence, Acknowledge, Reset)
- ✓ Pushbuttons can be locally wired or remotely input over the network from Omni4000, SCADA, DCS etc.
- ✓ Up to 8 audible and 8 beacon outputs
- ✓ Up to 16 Group Alarm outputs
- ✓ Map any input to any alarm window
- ✓ Shelving on individual alarms or entire groups.
- ✓ Fail-safe shelving alarms cannot stay inhibited.



A typical Alarm Sequence

Omniflex Alarm Annunciators:
Over 100 thousand points delivered,
and counting...

DISPLAYS

Alarm Windows improve reaction times

Alarm Fascias

Traditional window alarm annunciator fascias provide the fastest means of alarm notification to operators in the face of avalanche conditions. MAXILARM provides the option of adding alarm fascias to any MAXILARM node.

Omni-X Alarm Displays

OMNIFLEX manufactures a wide range of alarm displays to suit the application. The most popular range of displays for MAXILARM systems is the Omni-X series.

Any Configuration

The Omni-X Remote Displays provide from 8 to 144 points of annunciator display in a stand-alone panel-mount package.

The Omni-X displays are directly compatible with the MAXILARM system through the Maxiflex 32DO modules allowing multi-core cable connection without the need for individual wiring, reducing system costs.

Dual Redundant Display

Each window of the Omni-X display incorporates dual redundant solid state LED lamps, to ensure the most reliable window display available.

Control Pushbuttons and audible warning device can be incorporated into the Omni-X display.

Maxilarm Compatible

The Omni-X Remote Displays plug directly into Maxilarm Model M1342A 32DO modules for minimum system integration costs.



- ✓ Sizes from 8 to 144 Windows
- ✓ Bright Back-Lit Display.
- ✓ Choice of Incandescent or Solid-State LED Display
- ✓ Redundant LED's or Lamps in every window for fail safety.
- ✓ Plug-in for low Cost integration
- ✓ Practical Window Format for Readable Legends
- ✓ Window legends easily printed on inkjet/laser
- ✓ Optional integral pushbuttons and audible.



NETWORKING

Networking for the harsh environment

Choice of Network

MAXILARM, as a distributed alarm and event system, relies upon a data network to interconnect the remote nodes with a supervisory computer such as the Omni4000 Alarm and Event Station.

MAXILARM supports two network choices:

Ethernet

Ethernet has become the leading industrial network on the modern plant, and MAXILARM supports Ethernet communications.

Conet

There are many situations where the laying of dedicated network cabling to integrate the alarm and event system is impossible or cost prohibitive.

To suit these situations, Omniflex offers the **Conet** industrial networking alternative.

The **Conet** cable network has been developed as a rugged, secure industrial grade network that will operate on **existing plant cabling**. **Conet** is well proven in this role, providing a reliable networking medium where laying special cables is undesirable.

The **Conet** cable network operates at 62.5kBits per second and has been proven over distances up to 10km, establishing its reputation as the world's most rugged network.

Resilient Architecture

Whatever the choice of network, the **MAXILARM** AES network is able to withstand temporary loss of data communications without loss of events.

Time stamping at source with multiple stages of front end queuing provides an architecture resilient to the disruptions in communications that can occur from time to time.



Conet

- ✓ Up to 127 nodes
- ✓ Up to 10km network length.
- ✓ Runs on two cores of any existing cable
- ✓ Runs on old unspecified cables
- ✓ full peer-to-peer token-passing network
- ✓ 62.5kBits per second
- ✓ 1500V network isolation at each node
- ✓ designed for rugged environments
- ✓ Easy to setup and maintain
- ✓ Connect multiple Conet networks for even greater distances and flexibility.

Conet:

The world's most rugged network

INTEGRATION

Seeing the complete picture

System Integration

No alarm and event system stands alone. All alarms are part of some larger control system, and relating the alarms to the rest of the plant is vital to quick diagnostics, and hence reduced down-time and increased safety.

Omniflex understands this and has added to MAXILARM the ability to integrate other data into the Alarm and Event System, so that this data can be logged and viewed together with the alarms and events.

Analogue Inputs

The MAXIFLEX hardware platform includes a comprehensive set of analogue input modules that can be included in the **MAXILARM** AES system. Examples include isolated direct input thermocouple and RTD modules, fast counter modules and on-line HART loop monitors. Many of these modules have integrated setpoint monitoring built into the module, and these setpoints can be configured as inputs to the **MAXILARM** AES.

Digital Inputs

Other digital non-time critical inputs can also be incorporated into the **MAXILARM** AES. These inputs can be logged by the supervisory, can be used as inputs to the **MAXILARM** alarm annunciator, or can be manipulated by an IEC1131-3 user program in local logic.

Third Party interfaces

The MAXIFLEX system also offers a comprehensive set of intelligent Network interface Modules (NIM's) that can be used to integrate data from third party products.



MAXIFLEX:

A proven hardware platform for automation and control.

OPC Standard Interface



Choice of Supervisory

MAXILARM is designed to work with a supervisory computer system for alarm and event logging, operator control and system administration.

Omni4000

Omniflex recommends the **Omni4000** Alarm and Event Station which is purpose designed with the tightest integration with the **MAXILARM** system.

The **Omni4000** interfaces to the **MAXILARM** AES through an OPC server, allowing multiple operator stations to co-exist on the system.

OPC Server

A key component to the supervisory interface is the Omniflex **Conet/OPC server**. The Conet/OPC server has the ability to accept the time-stamped events from the **MAXILARM** AES and interface those to a conventional SCADA operator station through a standard OPC-DA interface.

Conet/OPC

Conet is the underlying network protocol technology that facilitates the event transportation, time synchronisation and remote configuration of the **MAXILARM** AES

The Conet transport protocols operate either over the Conet ruggedised industrial network, or over conventional Ethernet networks.

Either way, the **Conet/OPC** server forms the link in the event transport layer, connecting any OPC Client to the **MAXILARM** AES.

A **MAXILARM** AES node will support up to four Conet/OPC servers, allowing for redundant systems to be configured.



Conet Technology Inside

Omni4000 Alarm & Event Station

Omni4000

The **Omni4000** Alarm and Event Station is purpose designed with the tightest integration with the **MAXILARM** AES.

The system can be configured so that Omni4000 can acknowledge alarms on MAXILARM, and vice versa, providing a seamless operation from either the alarm fascias or the computer monitors.

Reduced Engineering

Preconfigured layouts, menus and operations reduce engineering time, and decrease implementation risk by eliminating all software design. Standard O&M manuals are supplied.

Increased Reliability

Operators quickly become familiar with the standardised ergonomic layout, and Omniflex can provide operator training in accordance with EEMUA 191.

Just install and configure.

Redundancy

Omni4000 provide a flexible database structure allowing redundant database support with many Omni4000 clients mapping to one or more databases.

OPC Client

Omni4000 acts as an OPC client to the Conet/OPC server, accepting time-stamped events from MAXILARM and sorting events from multiple sources into a single chronological event log, synchronised to a single time-base.



Features:

- ✓ Up to 4800 Alarms per station.
- ✓ Any number of Group alarm groups.
- ✓ Keyboard control of fascia (SIL ACK RES)
- ✓ Control **MAXILARM** and vice versa.
- ✓ Auto or Manual Reset per alarm.
- ✓ Complies with EEMUA 191 & SP18.02.
- ✓ Overview display of up to 1500 points, with drill down capability
- ✓ Multiple Alarm list displays, with filters on Alarm points and groups of alarms
- ✓ 5 levels of Alarm priority
- ✓ Shelving of alarms on a time basis
- ✓ Shelving of alarms in groups
- ✓ Produce a list of shelved alarms
- ✓ Multiple Event Windows of all events
- ✓ Filter Events by alarm type, tag name, time frame
- ✓ All event windows exportable to CSV format
- ✓ Multi-level security for levels of operator
- ✓ Redundant Database support
- ✓ Maps many clients to 1 or more databases.
- ✓ Interfaces to the Omniflex OPC Server
- ✓ Designed with built-in queue support for the **MAXILARM** AES.

Omniflex:

Over 30 Years of Alarm Experience

SPECIFICATIONS

MAXILARM

All specifications given are quoted per Alarm Node

Please see individual product datasheets for more detailed information

Power Supply

Choose from the following Maxiflex Power Supplies	
M1101A	24Vdc or Solar Input + Charger
M1102A	24Vdc
M1104A	48Vdc
M1151C	85-264Vac
M1152A	110/220Vac+Charger

Alarm & Event Inputs¹

Alarm points	240 max
Event inputs (time stamped to 1ms)	800 max
Input Sense	Normally Open/Normally Closed (Software selectable)
Contact bounce filtering	0-1000ms selectable per input
On/Off Delay Timers	-100 to 32767ms selectable per input
Spurious Chatter Filter	Selectable per input from 0 to 65535ms. Detects inputs chattering and inhibits chattering contacts from flooding event queues.
Event Buffering	9362 events per 32 inputs
Time Stamp Resolution	1millisecond
Input Scan Rate	200 microseconds
Min pulse width accepted	600 microseconds guaranteed
Max spike width rejected	150 microseconds guaranteed
Nominal Wetting Voltage	24Vdc or 48Vdc
Input Indication	Green LED per input

1) Specifications based upon using M1760A or M1761A Maxiflex 32SOE Modules.
See individual datasheets for more details.

Pushbutton Inputs

No. of Pushbuttons	32 maximum
Functions	Silence, Acknowledge, Reset, Test

Lamp Outputs²

Quantity	240 max.
Lamp States	Off, On, Fast Flash (80 fpm), Slow Flash (20fpm), Intermittent Fast Flash (combined fast and slow)

2) Specifications based upon using M1342A Maxiflex 32DO Modules.
See individual datasheets for more details.

Audible Warning Outputs

Quantity	8 max.
Type	Select from Maxiflex output modules
Function	According to Alarm Sequence

Beacon Outputs

Quantity	8 max.
Type	Select from Maxiflex output modules
Function	According to Alarm Sequence

Group Alarm Outputs

Quantity	16 max.
Type	Select from Maxiflex output modules
Function	Select per GA from: <ol style="list-style-type: none"> 1. Follows Alarm state 2. Follows Input 3. Ring-back Horn 4. Multiple Reflash

First-Out Outputs

Quantity	8 max.
Type	Select from Maxiflex output modules
Function	Allows First groups across systems

Alarm Sequences

1	LAMP FOLLOWS INPUT
2	MOMENTARY (FLEETING) ALARM, MANUAL RESET
3	ALARM ONLY (NON-LATCHING INPUTS) AUTO RESET
4	MOMENTARY ALARM, MANUAL RESET WITH ALARM RINGBACK
5	FIRST OUT, MULTIPLE GROUPS, MANUAL RESET
6	FIRST OUT, MANUAL RESET, AUTO RESET ON SUBSEQUENT ALARMS
7	FIRST OUT, SINGLE GROUP, MANUAL RESET, FIRST OUT CONTINUOUS FLASH
8	FIRST OUT, MANUAL RESET, SUBSEQUENT ALARMS WITHOUT HORN
9	MOMENTARY ALARM, MANUAL RESET, AUTO SILENCE AFTER TIME DELAY.
10	MOMENTARY ALARM, MANUAL RESET, REALARM AFTER TIME IF STILL ABNORMAL.
11	MOMENTARY ALARM, MANUAL RESET, CONSTANT FLASH (FOR MOTOR ALARMS).
12	MOMENTARY ALARM, AUTO RESET, TIME DELAY ON RETURN TO NORMAL.
13	PULSE MONITORING ALARM; MANUAL RESET
18	MOMENTARY ALARM, AUTO RESET
21	FIRST OUT, MULTIPLE GROUPS, AUTO RESET
23	FIRST OUT, SINGLE GROUP, AUTO RESET, FIRST OUT CONTINUOUS FLASH
24	FIRST OUT, AUTO RESET, SUBSEQUENT ALARMS WITHOUT HORN
25	MOMENTARY ALARM, AUTO RESET, AUTO SILENCE AFTER TIME DELAY.
26	MOMENTARY ALARM, AUTO RESET, REALARM AFTER TIME IF STILL ABNORMAL.
27	MOMENTARY ALARM, AUTO RESET, CONSTANT FLASH (FOR MOTOR ALARMS)
28	PULSE MONITORING ALARM, AUTO RESET

Supervisory Network Interface

No. of Maxilarm nodes	126 max.
Event Queue	4 heads per queue max
Network Type	Ethernet(Conet/e), Conet/c, Conet/s

Time Synchronisation

Over Conet network	100ms accuracy (uses IEEE1588)
Over Ethernet	0.5ms accuracy (uses IEEE1588)
Using local GPS	0.1ms accuracy

Flash Synchronisation

Type	Select from Maxiflex I/O modules
Function	Synchronises flashing between MAXILARM nodes

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