USER'S MANUAL

Maxiflex SER System Guide

SCOPE

This System Guide provides information on how to install and configure a Sequential Event Recording system based on the Maxiflex product range. Products include M126x P3 CPU and M176x 32SOE module.

SOFTWARE COPY AVAILABLE

This manual is available in printed form or in Adobe Acrobat pdf format.

The pdf file is named SGSERR01.pdf

REVISION HISTORY

Date	Revision	Comments
November 2006	1	Initial Issue

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1. Introduction

A SER (Sequential Event Recording) system is used to accurately timestamp digital input changes and stores this information until the user requires it. A SER system typically comprises of three major components, a CPU, SOE (Sequence of Events) module and an OPC server. A Printer can also be added to the serial port of the CPU with supporting user application software. Figure 1 shows a block diagram of basic SER system.

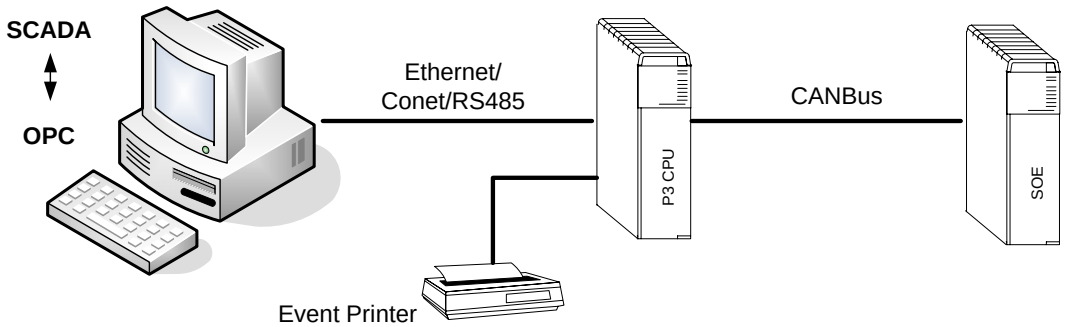

Figure 1 - Block diagram of a SER system

The SOE module scans its digital inputs and stores COS (Change of State) information, i.e. what time the input changed and its status (On or Off) in its internal Buffer. A single Record of “Input Change Time” and “Input Status” is called an Event. The CPU polls the SOE for any events which it may be storing. These events get transferred over the CANbus link to the CPU.

The CPU takes these events and stores them in its own Queue, keeping them until the OPC server retrieves them or until they are printed by an Event printer. The CPU will not poll the SOE modules for events unless it has space to store a retrieved event locally in its Queue.

If the events are taken by the OPC server they are stored in a Database on the Computer.

2. Minimum System Requirements

The following items are required in order to get a basic SER system setup.

Module name	Model Number
32SOE module	M176x
P3 CPU	M1260E M1261E M1262F M1267B
Maxiflex Base	M1022B
Maxiflex Power supply	Any
Termination resistor	TBA
CANBus Cable (For Remote IO applications)	TBA

3. System Installation

3.1 Base Configurations

An SER system can be setup in three basic configurations:

3.1.1 Single Base

This is when the 32SOE modules and the CPU are installed on the same base with no additional 32SOE modules on any other bases. In this configuration a CANBus cable is not required for inter base connections. The termination resistor can simply be placed on the same base as the CPU and the 32SOE.

3.1.2 Multiple Bases

In a Multiple base system, 32SOE modules are spread across different Maxiflex bases in the system. In this configuration CANbus cables are required to connect Maxiflex bases together which hold 32SOE modules and the CPU which is going to be used to transfer the events to the printer or the OPC server. Figure 2 shows the connection

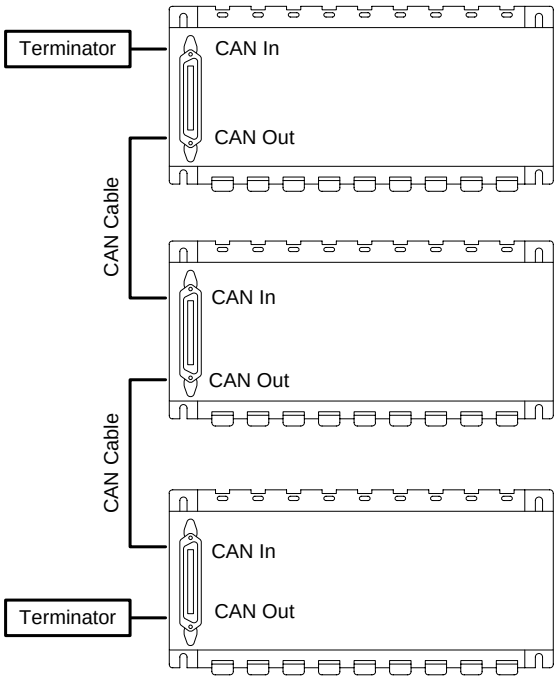

Figure 2 – Multiple Base CANbus connections

3.1.3 Redundant Bases

In a Redundant system one needs to ensure that the Primary Controller and the Secondary Controller each have their own CANbus connection and termination to the rest of the Maxiflex bases which carry 32SOE modules. In a Redundant

system no I/O modules should be placed on the Primary/Secondary controller Maxiflex bases. Figure 3 shows the connection of a redundant system.

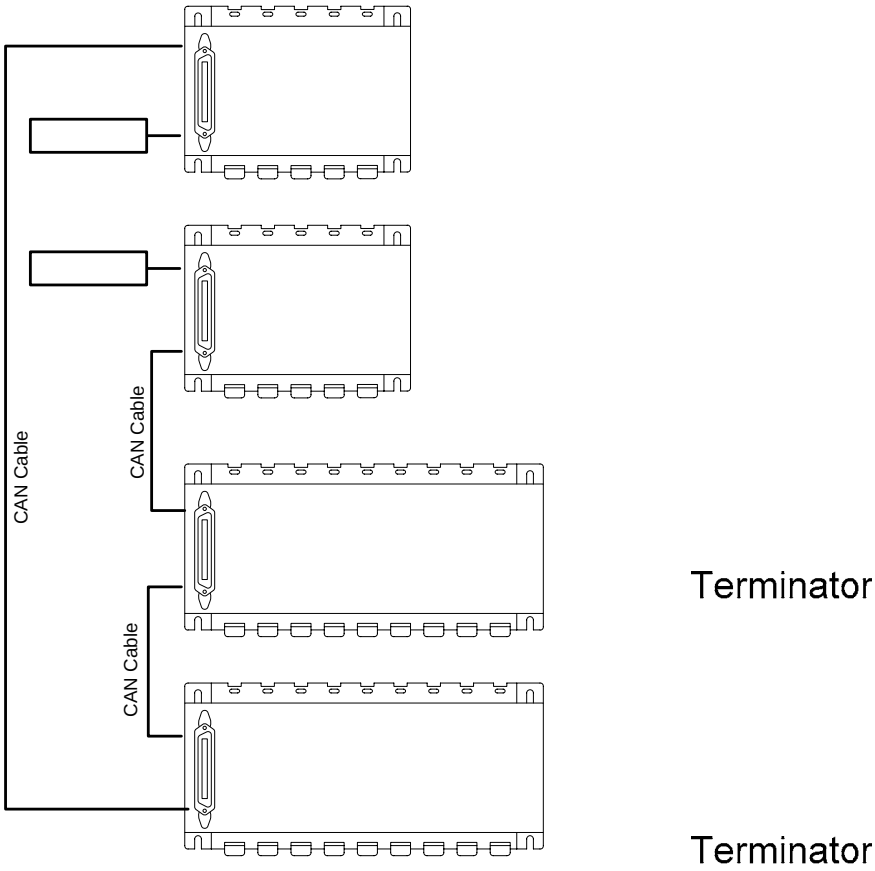

Figure 3 – Redundant Bases CANbus connections

3.2 Module Wiring

The 32SOE module is connected to the field wiring through a multicore cable (Model C1467A) and remote terminal board (Model C6332A). The screen connection should be wired to earth for EMC prevention. The Terminal and Module Common connections on the terminal board are either wired together or to a supply depending on your input. Any unused inputs should be wired to the common line and not left floating. Consult the 32SOE user manual for wiring diagrams.

4. System Configuration

Once the system has been wired together some software configuration is needed.

4.1 32SOE Module

Connect to the CPU which is on the same Maxiflex base as the 32SOE module. For information on how to connect to the CPU please refer to the User manual for the CPU you are using. Refer to the User Manual for the 32SOE for information on the configuration options for the module. Once the module is configured ensure that the module can be seen in the Module Status. Figure 4 shows two 32SOE modules in Slot 4 and Slot 5.

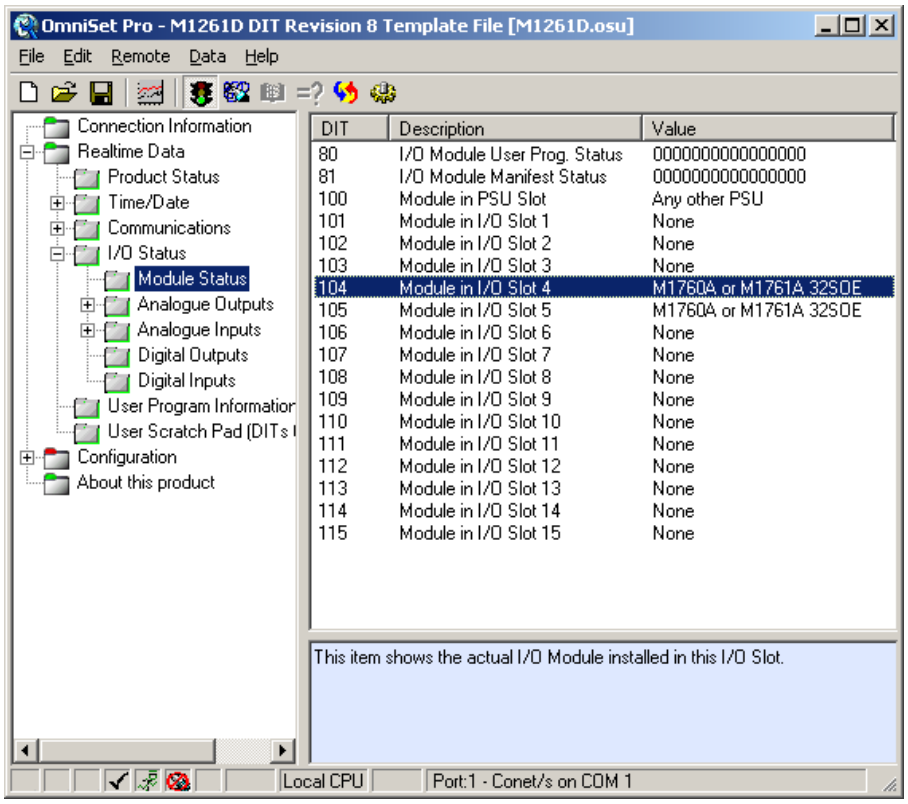

Figure 4 – 32SOE modules in Slot 4 & 5 shown in Module Status

4.2 CPU(s)

This section will discuss the SER system specific setup for the CPU, other configuration details can be found in the CPU user manual.

4.2.1 Rack Position

For a given system of bases, where all the bases are connected via the same CANbus, all CPU's in that system need to have their Rack position configured. No two Maxiflex Bases in the system can be assigned the same "Rack position". Figure 5 shows the configuration of a CPU to "Local Rack".

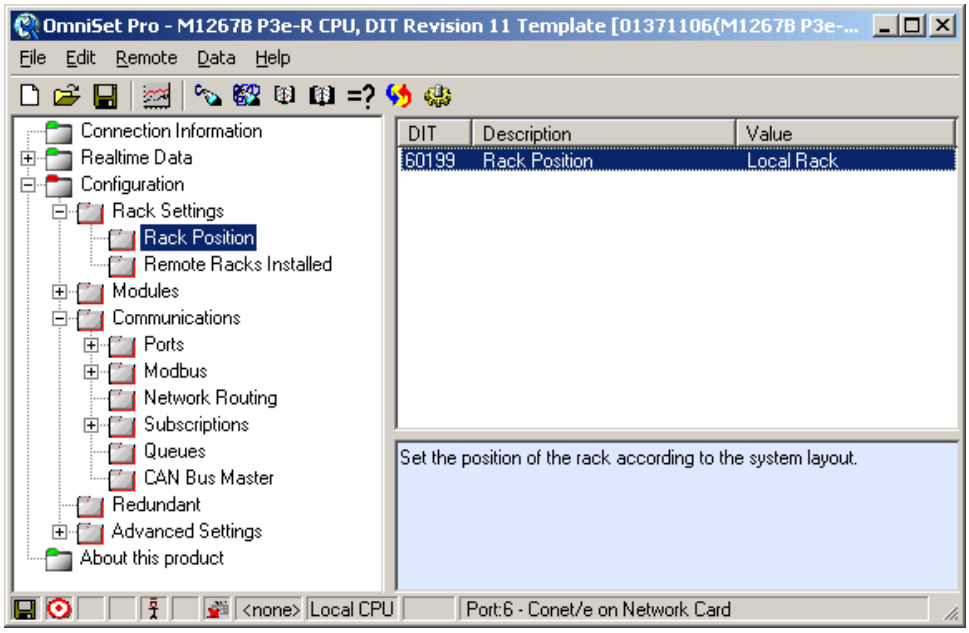

Figure 5 – CPU being configured to "Local Rack"

4.2.2 Event and Time Master

The user needs to decide which CPU in the system of multiple bases will become the "Event Master" and "Time Master". The Event master CPU is responsible for collecting Events in the System and storing them in its Queue. The Time Master CPU is responsible for setting the current time on the 32SOE modules. Using Omniset the Event and Time Master setting can be changed for CPU's in the system. One needs to be careful that only one CPU in the system be configured as the Event or Time Master. Having two Event or Time Masters in the system will result in unacceptable Time jitter and lost Events. Figure 6 shows the setting of Event and Time Master using Omniset.

In Single base systems the CPU must always be configured as the Event and Time master.

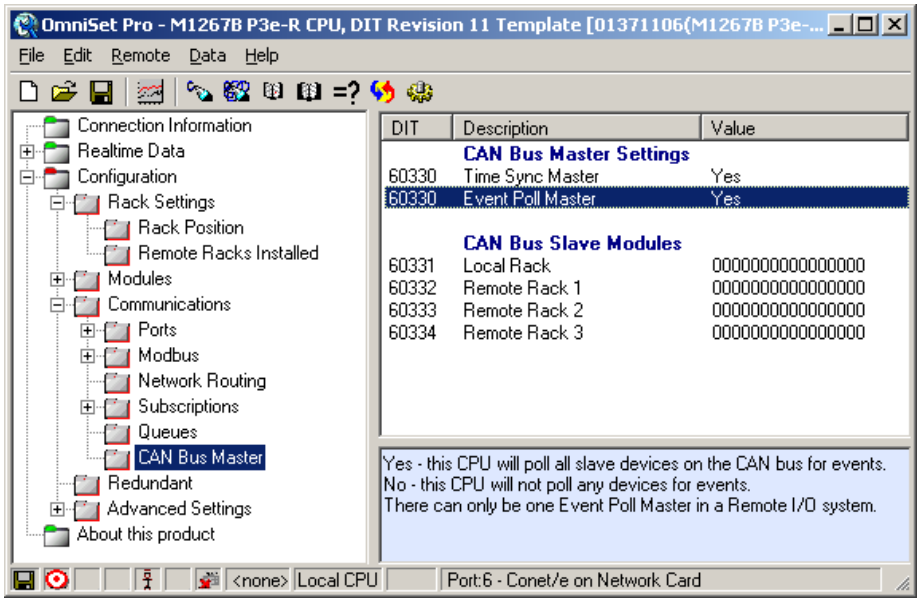

Figure 6 – CPU being configured as the Event and Time Master

4.2.3 CANBus Slave Nodes

The CANBus slave configuration tells the Event Poll Master which 32SOE modules are present in the system. The least significant bit starts from the right and represents the CPU slot, which is normally zero. The next bit to the left represents I/O Slot 1 and so forth up to I/O Slot 15 which is the left most bit. The bit is set to '1' if the module is meant to be installed in that slot; otherwise it is '0'. Be careful not to set Bits to '1' when a module is not installed as this will result in a poor event transfer speed in the system. Figure 7 shows modules enabled in slot 4 in Remote Racks 1, 2 and 3;

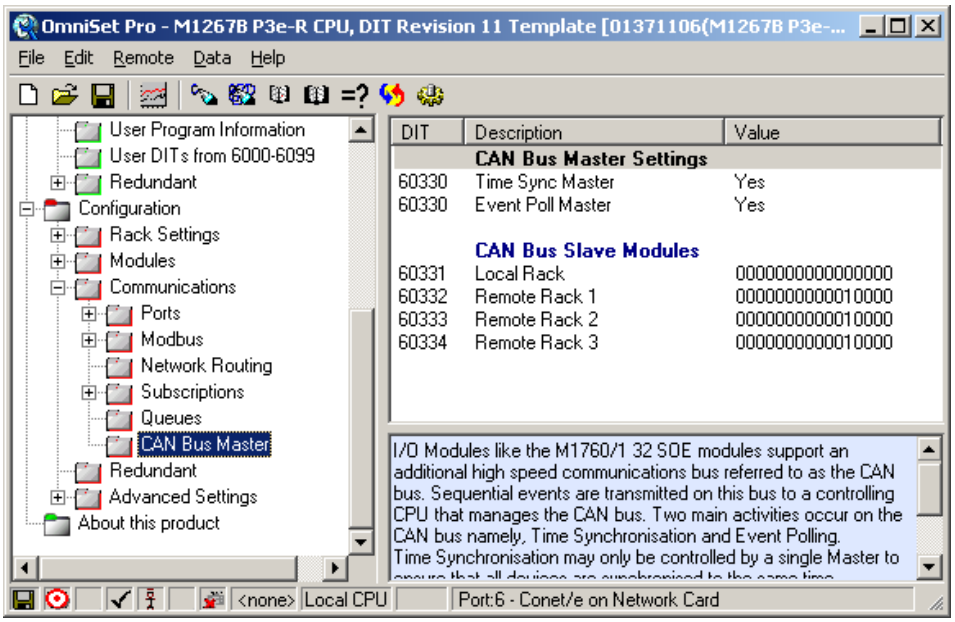

Figure 7 – 32SOE modules enabled in Slot 4 in Remote Racks 1, 2 and 3

Once the installed modules have been enabled as Slave Nodes one can check if the modules are online by clicking on the CANBus Master Status group. A '1' in the Bit pattern means that the module is online, while a 0 means that the module is either Not present, Not responding or not configured to be present in the CANBus master configuration mentioned above. The Bit patterns shown here should match the configured pattern in the CANBus Master configuration shown in Figure 6. Figure 8 shows the CANBus Master status.

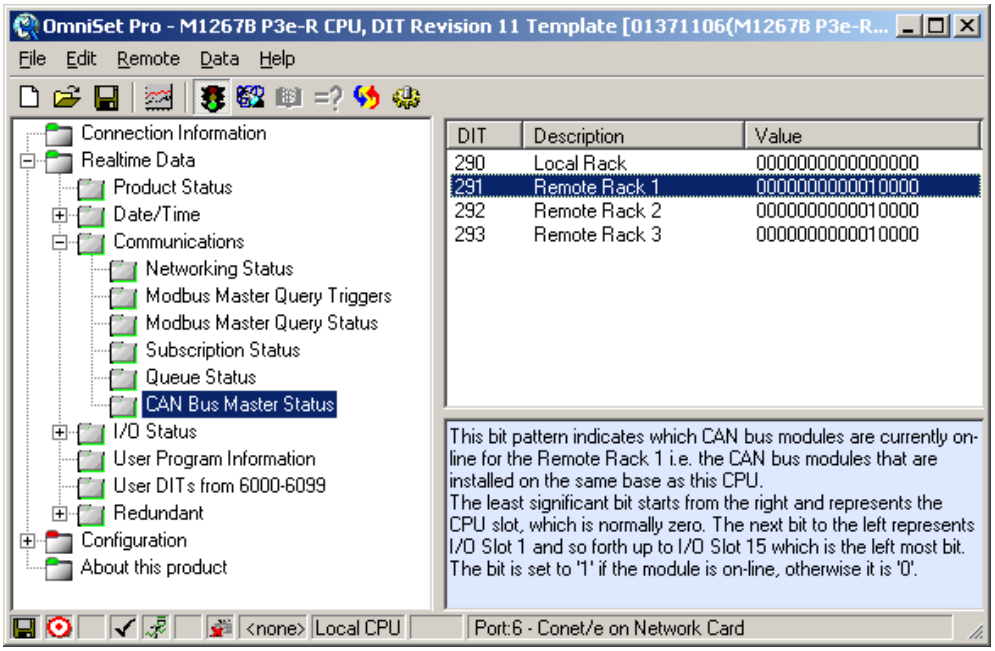

Figure 8 – CANBus Master Status

4.2.4 Queue Configuration

The Queue configuration needs to be done for the CPU which is the Event Poll master. A detailed description of the Queue Service can be found in the CPU Manual. The user needs to decide which Queue Heads are going to be used and set them to Master. All unused heads must be set to Slave. Figure 9 shows Head 0 being configured as a Master Head

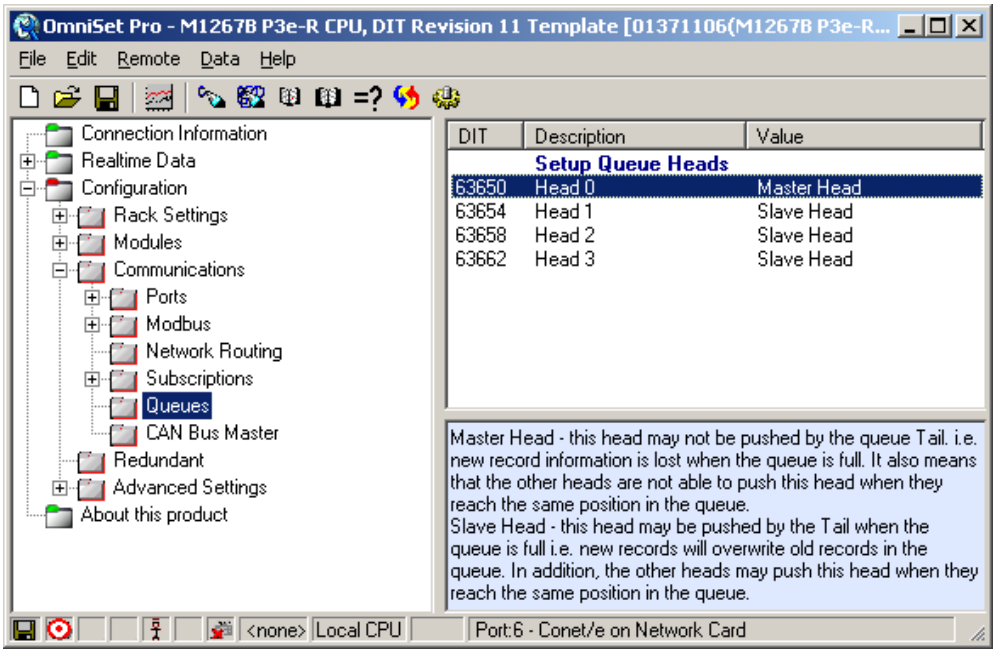

Figure 9 – Head 0 configured as a Master Head

4.2.5 Redundant System Exceptions

Redundant systems have a unique configuration because both the Primary and Secondary controller have the exact same configuration with respect to the SER system. When one controller is Active the other is always in Standby. A Standby CPU never polls for Events or sends Time messages, even if configured as a Time/Event Master. The same configuration is needed in both CPU's so that when the CPU's switch over the new active CPU can carry on in the exact same manner as the previously Active CPU.

4.3 OPC Configurator

This section describes the SER specific configuration of the OPC configurator. It assumes the reader has installed the OPC configurator and has prior knowledge of its operation and setup. Information can found in the OPC configurator user manual.

Launch the configurator, right click on Address Space -> New - > Port. Give the Port a Name and Select which Port you wish to communicate with on the Event Master CPU. **Click "Apply"**. The Port you select must support the Conet Protocol. If Ethernet (Conet/e) is to be used UDP must be selected, not TCP. Figure 10 shows a new Port which has been added Named "Ethernet" using Conet/e UDP.

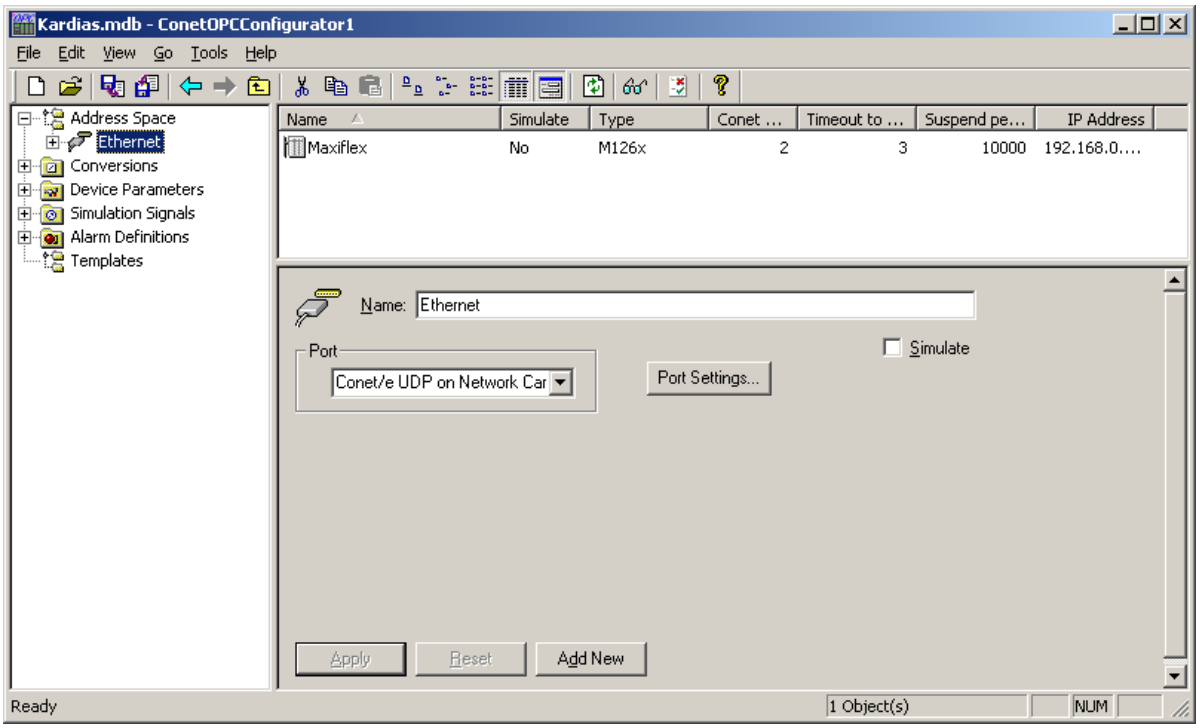

Figure 10 – Ethernet Port using Conet/e UDP

Now that the Port has been setup, a Device needs to be created. Right click on your newly created port and Select New -> Device. Give this device a Name. The type of device must be set to M126x CPU. The Queue Number and Head number which you intend on using needs to be selected. (This is the same Head number that was configured to Master in the CPU). If you want the OPC configurator to keep the time on the CPU accurate, tick the "Time Sync" check box and Tick the "Use Modified Julian Date" check box. If you want the CPU to update the time on the OPC configurator, select Tick the "Time Sync Master" check box. **Click "Apply"**

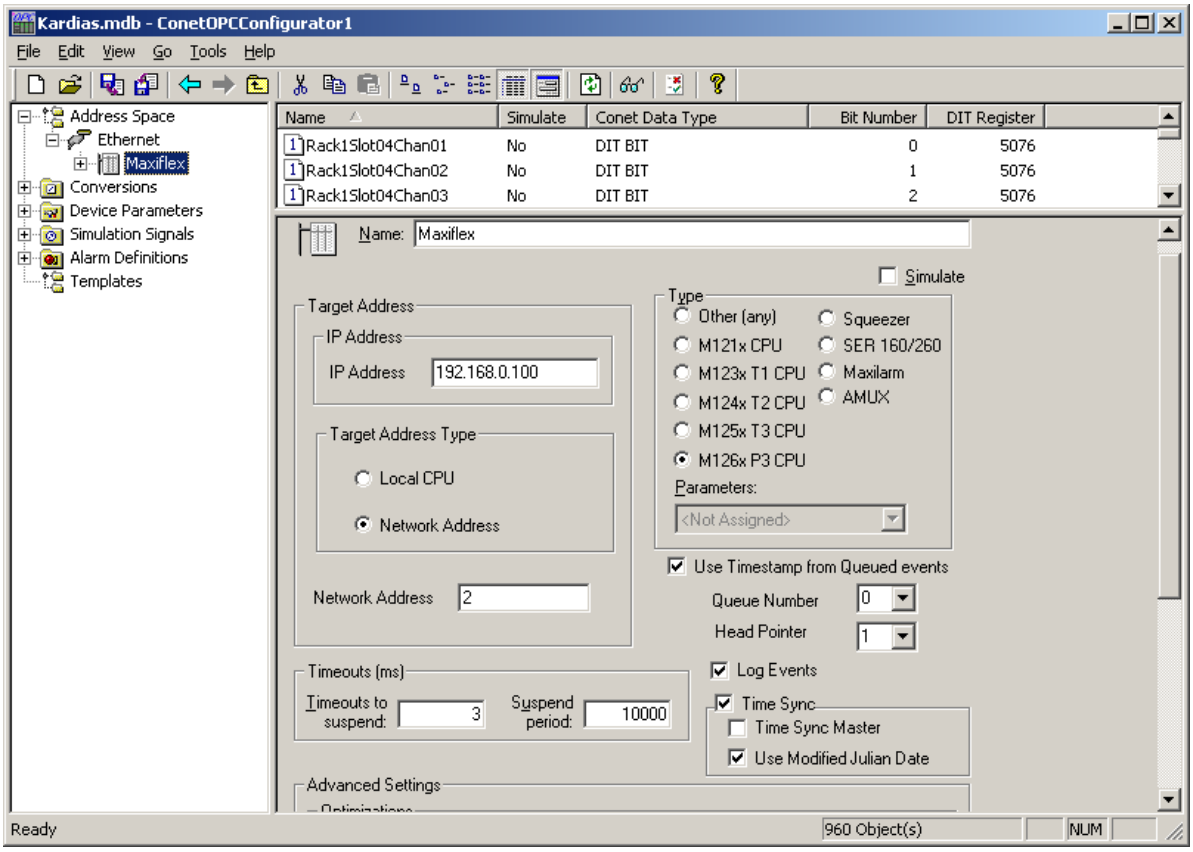

Figure 11 – Maxiflex Device using Head Pointer 1

Now that the Device has been setup, a new Data Item needs to be added for monitoring on that Device. These "Data items" refer to the inputs on the 32SOE modules. Right click on your newly created Device -> New -> Data Item. Give this Data item a Name. The DIT and BIT number for this input needs to be setup. The following formulas are used to Map a DIT and BIT Numbers to module Input Numbers, Slot and Racks.

For Inputs 1-16:

DIT Number = 5000 + (Rack * 60) + (Slot * 4)

BIT Number = Input Number

For Inputs 17-32:

DIT Number = 5000 + (Rack * 60) + (Slot * 4) + 1

BIT Number = (Input Number – 16)

Input Number from 1 – 32, Slot from 1 – 15, Rack from 0 – 3 (0 for Local Rack)

E.g.: Input 20 on Slot 2 on Rack 0 -> DIT Number = 5009 , BIT Number = 4

Input 5 on Slot 6 on Rack 2 -> DIT Number = 5144 , BIT Number = 5

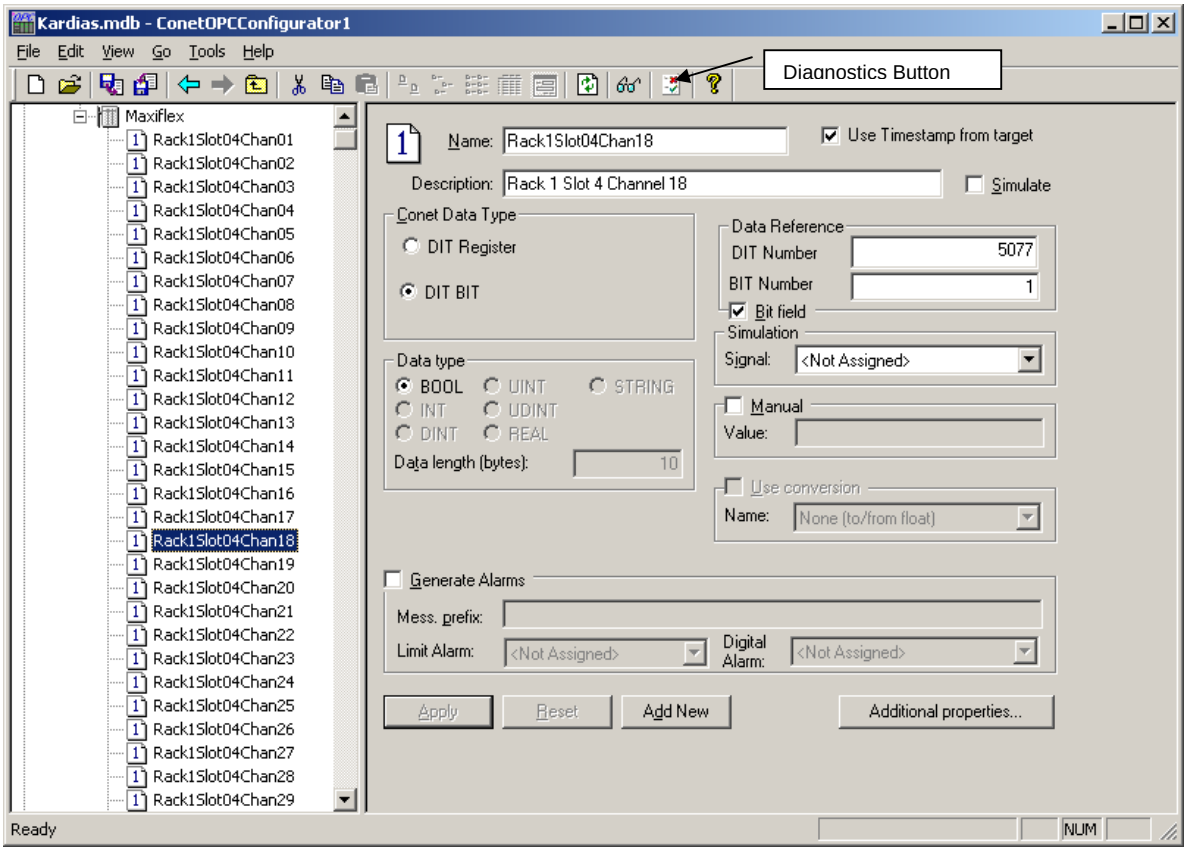

Figure 12 – Data item for Rack 1, Slot 4, Input 18.

Now that the Input has been configured Press “F12” to enter “Monitor View mode” and start the OPC server polling the CPU for events. To monitor the OPC configurator and watch how many events it is retrieving you can click on the “Diagnostics button” (Shown in Figure 12) and open the Diagnostic Box (Shown in Figure 13). Once the window is open Select the Device you wish to monitor.

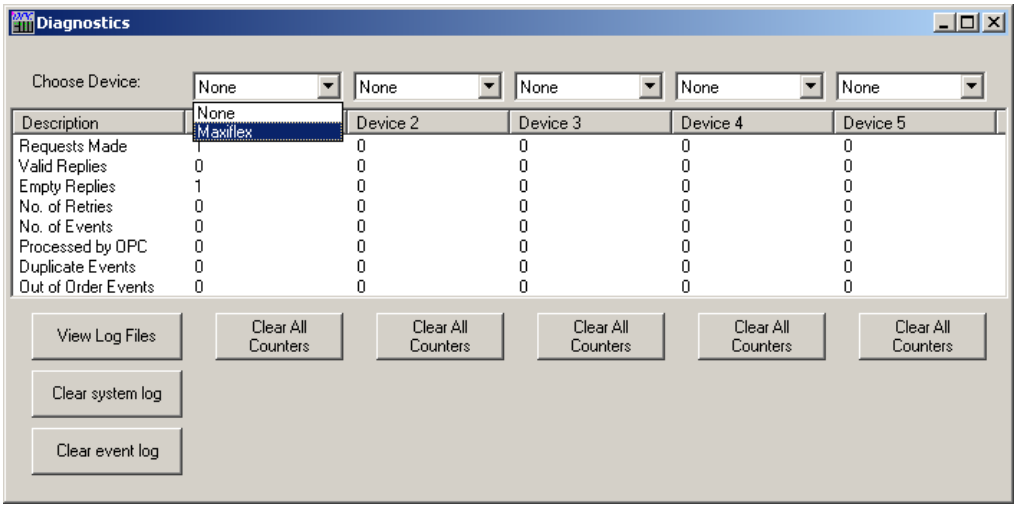

Figure 13 – Diagnostic Box