



MOX 603 Communications Processor

User Guide

0809-603-2303



Preface

Scope of the User Guide

This MOX 603 Communications Processor User Guide contains operation information of hardware familiarization and software configuration for the following modules:

- MX603-3005 CP RS232
- MX603-3007 CP RS485
- MX603-3010 CPE
- MX603-3012 CPE
- MX603-3014 CP Gateway

The information found within this document is relevant only for the latest release of MOX 603 products. For information about earlier MOX 603 products, please contact your local MOX supplier.

This guide has been organized for the operator, and is expected that the user is an engineer, technician, electrician or similar with an understanding of the operating and programming requirements of the MOX 603 modules.

Related Documents

The MOX 603 components contain a collection of MOX equipment and several software packages. For this reason, a number of related documents should be read in conjunction with this user guide.

The related documents are noted below:

- MOX Open Controller Technical Overview
- MOX Field Controllers Technical Overview
- MOX Open Controller User Guide
- MOX Unity User Guide
- MOX 603 IO Technical Overview
- MOX 603 Rack Base IO User Guide

Conventions Used



When you see the “exclamation mark” icon in the left-hand margin, the text to its immediate right will be a special note. Please ensure that you read this information to increase your understanding of the systems operation.



When you see the “stop sign” icon in the left-hand margin, the text to its immediate right will be a warning. This information could prevent injury loss of property or even death (in extreme cases). It is very important that you stop and read this information and ensure that you have complete understanding before continuing with the procedure.

Contents

1	OVERVIEW	1
2	MODULE SPECIFICATIONS	2
2.1	MX603-3005 CP RS232	2
2.1.1	Module Familiarization	2
2.1.2	Datasheet	2
2.1.3	Communication Ports	3
2.1.4	LED Descriptions	3
2.2	MX603-3007 CP RS485	4
2.2.1	Module Familiarization	4
2.2.2	Datasheet	4
2.2.3	Communication Ports	5
2.2.4	LED Descriptions	5
2.3	MX603-3010 CPE	6
2.3.1	Module Familiarization	6
2.3.2	Datasheet	6
2.3.3	Communication Ports	7
2.3.4	LED Descriptions	7
2.4	MX603-3012 CPE	8
2.4.1	Module Familiarization	8
2.4.2	Datasheet	8
2.4.3	Communication Ports	9
2.4.4	LED Descriptions	9
2.5	MX603-3014 CP Gateway	10
2.5.1	Module Familiarization	10
2.5.2	Datasheet	10
2.5.3	Communication Port	11
2.5.4	LED Descriptions	11
3	BASE AND POWER SUPPLY	12
3.1	Base	12
3.1.1	Familiarization	12
3.1.2	Datasheet	12
3.1.3	Safety Keying	13
3.1.4	Address Switch	13
3.1.5	Communication	14
3.1.6	Compatibility	14
3.2	Power Supply Module	15
3.2.1	Familiarization	15
3.2.2	Datasheet	16
4	SYSTEM ARCHITECTURES	17
4.1	Typical Connection via MOX OC	17
4.2	Typical Connection via MOX Unity	19
4.3	Redundancy Connection	20
5	INSTALLATION CONSIDERATIONS	22
5.1	Electrostatic Discharge	22
5.2	Environmental Precautions	22

5.3	Preventing Excessive Heat.....	22
5.4	Installation Cleanliness.....	22
5.5	Power Isolation	23
5.6	Terminal Connectors	23
5.7	DIN Rail Specifications.....	23
5.8	Cable Path Considerations	25
5.9	Ethernet Cabling to Ethernet Devices.....	25
5.10	Power Wiring.....	26
5.10.1	Power Requirements.....	26
5.10.2	DC Power Wiring (User DC Source).....	26
5.11	Applying Power.....	26
6	SOFTWARE CONFIGURATION IN MOXIDE	27
6.1	MOXIDE Configurable Options of CP RS232/CP RS485/CPE	27
6.1.1	Parameters.....	27
6.1.2	Configuration.....	28
6.1.3	Diagnostic.....	31
6.2	Configuration Procedure of CP RS232/CP RS485/CPE	34
6.2.1	Configuring a MOX CP Module via MOX OC.....	34
6.2.2	Configuring MOX CP Module via MOX Unity	37
6.2.3	Directly Configuring MOX CP.....	37
6.3	MOXIDE Configurable Options of CP Gateway	39
6.3.1	Parameters.....	39
6.3.2	Configuration.....	42
6.3.3	Diagnostic.....	42
6.4	Configuration Procedure of CP Gateway	45
	APPENDIX A PRODUCT SUPPORT	47

Figures

FIGURE 1	MX603-3005 FAMILIARIZATION	2
FIGURE 2	MX603-3007 FAMILIARIZATION	4
FIGURE 3	MX603-3010 FAMILIARIZATION	6
FIGURE 4	MX603-3012 FAMILIARIZATION	8
FIGURE 5	MX603-3014 FAMILIARIZATION	10
FIGURE 6	BASE MX603-3105 FAMILIARIZATION	12
FIGURE 7	KEYING CODE FOR BASE TOP	13
FIGURE 8	KEYING CODE FOR BASE BOTTOM	13
FIGURE 9	KEYING CODE FOR MODULE TOP	13
FIGURE 10	KEYING CODE FOR MODULE BOTTOM	13
FIGURE 11	ASSIGNMENTS OF THE ADDRESS SWITCHES	13
FIGURE 12	POWER MODULE COMPONENTS	15
FIGURE 13	EXAMPLE SYSTEM OF CPE WITH OPEN CONTROLLER	17
FIGURE 14	APPLICATION OF CP GATEWAY	18
FIGURE 15	EXAMPLE SYSTEM OF CP MODULES WITH MOX UNITY	19
FIGURE 16	CPE MODULES REDUNDANCY CONNECTIVITY	20
FIGURE 17	CPE CONNECTION FOR REDUNDANT PORTS	21
FIGURE 18	CP GATEWAY REDUNDANCY CONNECTION	21
FIGURE 19	DIN RAIL EN 50022	23
FIGURE 20	CP CONFIGURATION PAGE	28
FIGURE 21	CP DIAGNOSTIC PAGE	31
FIGURE 22	CP DIAGNOSTIC ITEMS SELECTION	31
FIGURE 23	MOXIDE AND MOX CP	34
FIGURE 24	NETWORK ARCHITECTURE	35
FIGURE 25	DOWNLOAD I/O PARAMETERS	35
FIGURE 26	DOWNLOAD I/O VARIABLE CONFIGURATION	36
FIGURE 27	ADD NEW MOX CP	37
FIGURE 28	ADD NEW MOX CP	38
FIGURE 29	ACCESS MODBUS SLAVE	40
FIGURE 30	ACCESS MODBUS MASTER	40
FIGURE 31	ACCESS TRANSPARENT SERIAL DEVICES	41
FIGURE 32	CP GATEWAY DIAGNOSTIC PAGE	43
FIGURE 33	CP GATEWAY DIAGNOSTIC ITEMS SELECTION	43
FIGURE 34	NETWORK ARCHITECTURE	45
FIGURE 35	UPLOAD PARAMETERS	46

Tables

TABLE 1	MX603-3005 DATASHEET	3
TABLE 2	MX603-3007 DATASHEET	5
TABLE 3	MX603-3010 DATASHEET	6
TABLE 4	MX603-3012 DATASHEET	8
TABLE 5	MX603-3014 DATASHEET	11
TABLE 6	BASE MX603-3105 DATASHEET	13
TABLE 7	POWER SUPPLY UNIT DATASHEET	16
TABLE 8	DIAGNOSTIC INFORMATION FORMAT	33
TABLE 9	CP GATEWAY PARAMETERS	39
TABLE 10	CP GATEWAY DIAGNOSTIC INFORMATION	44

1 Overview

The MOX 603 Communications Processor (CP) was designed as a communications concentrator between MOX controllers and MOX 603 I/O modules or other serial devices. There are different communication types for different applications.

- MX603-3005 CP RS232 (1 RS232 port and 1 RS485 port)
- MX603-3007 CP RS485 (2 RS485 ports)
- MX603-3010 CPE (1 RJ45 Ethernet port)
- MX603-3012 CPE (1 SC pair fiber port and 1 RJ45 Ethernet port)
- MX603-3014 CP Gateway (1 RJ45 Ethernet port, 1 SMA port & 2 RS485 ports)

A single CP module except CP Gateway can support up to 10 MOX 603 I/O modules connected to it on a single rack. Large systems with many I/O require multiple I/O racks with MOX 603 CP modules as a data concentrator at the head of the rack.

CP Gateway module is not designed for use with MOX 603 I/O modules. It is designed as a serial gateway module for communications between the MOX Open Controller and connected serial devices.

Each MOX 603 CP module provides comprehensive information to the user so that the operational status may be monitored and controlled more efficiently. The wide range of module specific diagnostic information may be accessed from a PC application package such as the MOXIDE user interface.

When such CP module is used as part of the MOX 603 I/O, the host controller connected to the CP module may also be configured to retrieve all or part of the diagnostic information from the I/O module directly or via the CP module, depending on the configuration. The CP module uses this information to efficiently manage the complete rack of I/O modules.



MX603-3020 CPP is also a member of MOX CP series, but it uses PROFIBUS protocol and has quite a different usage to CP modules listed here. So the introductions in this document are not applicable to MX603-3020. For detailed information about CPP, please refer to MOX CPP User Guide.

2 Module Specifications

2.1 MX603-3005 CP RS232

2.1.1 Module Familiarization

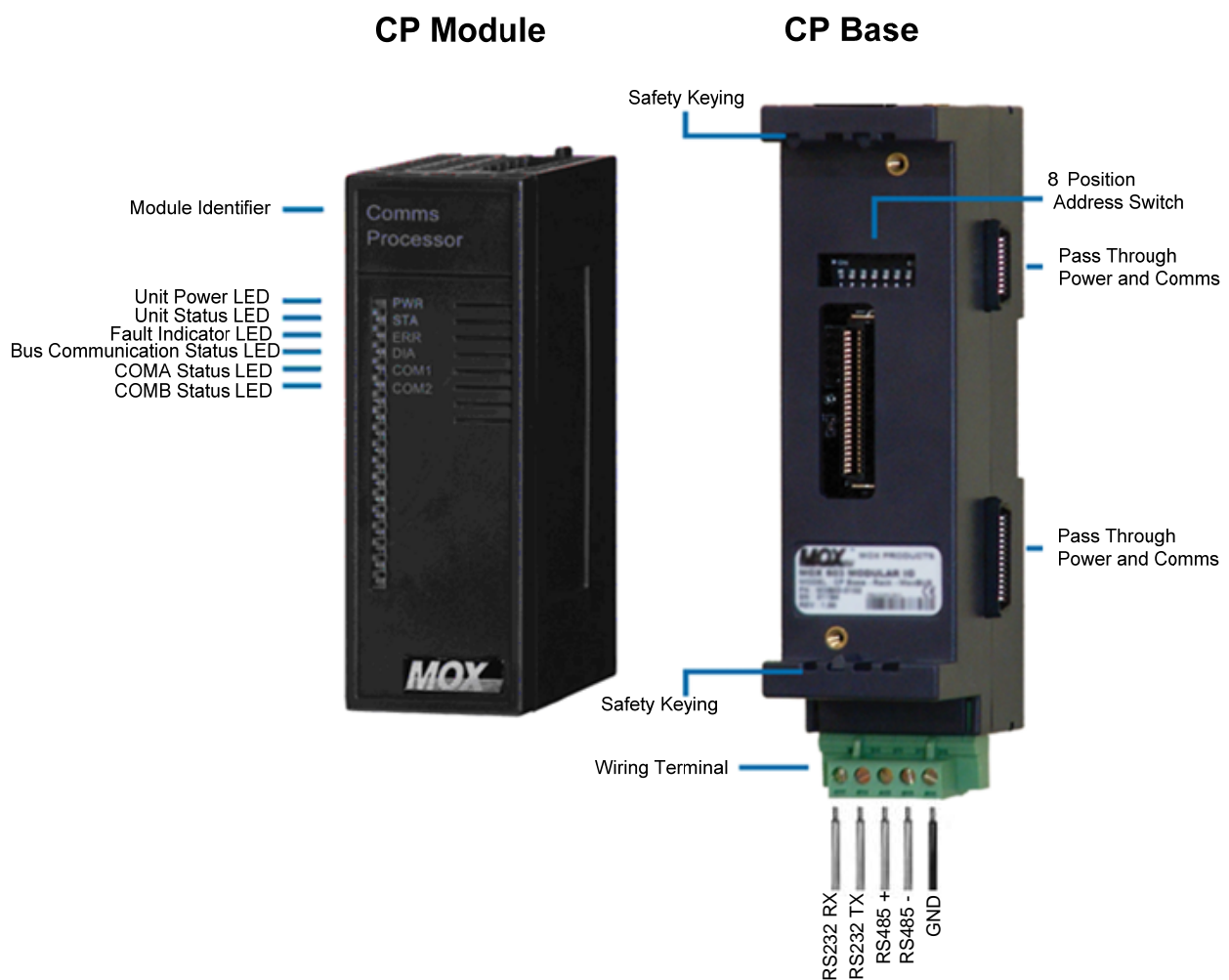


Figure 1 MX603-3005 Familiarization

2.1.2 Datasheet

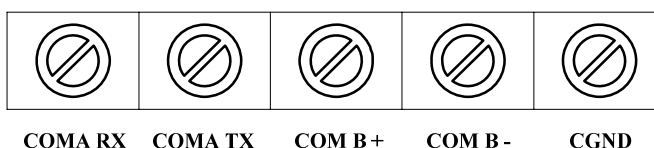
Power	
Power dissipation	<1.5W
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing
Communications	

RS232 port	x 1 up to 115200bps
RS485 port	x 1 up to 115200bps

Table 1 **MX603-3005 Datasheet**

2.1.3 Communication Ports

- One RS232 point-to-point serial communications port - COMA
- One RS485 multi-drop serial communications port – COMB



The baud rates of the serial ports are individually programmable up to 115,200 bps.



The factory set default baud rate is 9600 bps.

2.1.4 LED Descriptions

LED	Color	State	Description
PWR	Green	ON	The module is powered up
		OFF	The module is powered down
STA	Green	ON	The module is functioning
		Flash	The STA LED will flash at 0.5Hz for 4s during initialization status.
ERR	Red	ON	Parameters data (configured by MOXIDE) is in an erroneous (corrupted) state
		Flash	the CPCONF (CP Configuration File) information is in an erroneous state
		OFF	the Parameters data and CPCONF information are both OK
DIA	Green	Flash	CP is processing the cyclic data with I/O
		OFF	No cyclic data with I/O
COM1	Green	Flash	Communication is taking place on COMA
		OFF	No communication on COMA
COM2	Green	Flash	Communication is taking place on COMB
		OFF	No communication on COMB

2.2 MX603-3007 CP RS485

2.2.1 Module Familiarization

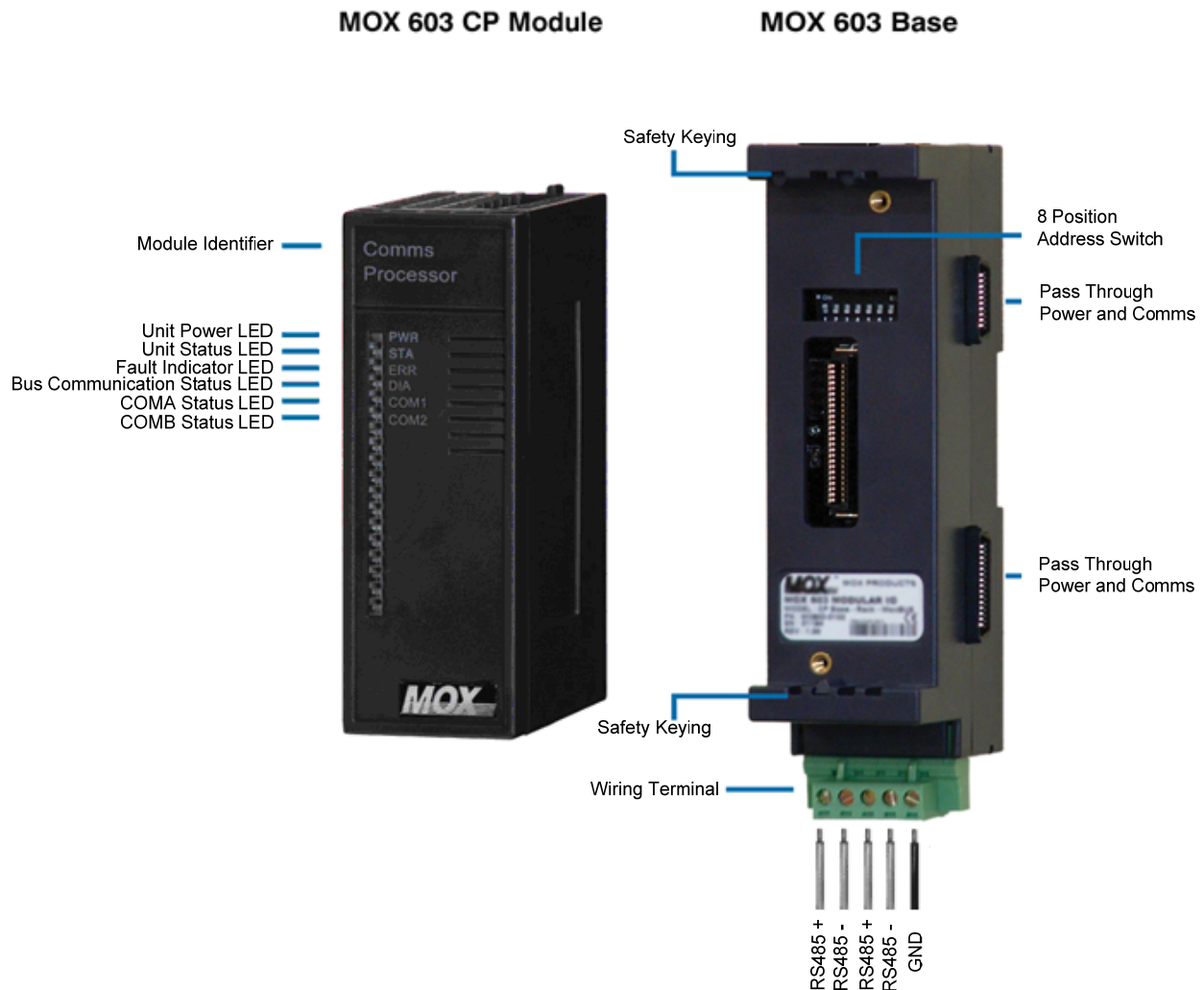


Figure 2 MX603-3007 Familiarization

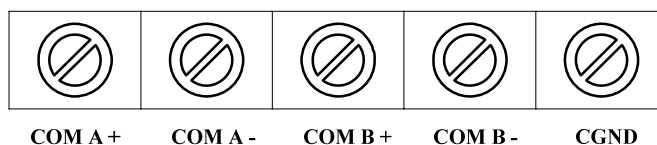
2.2.2 Datasheet

Power	
Power dissipation	<1.5W
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing
Communications	
RS485 port	x 2 up to 115200bps


Table 2 MX603-3007 Datasheet

2.2.3 Communication Ports

- Two RS485 multi-drop serial communication ports



The baud rates of the serial ports are individually programmable up to 115,200 bps.

	<i>The factory set default baud rate is 9600 bps.</i>
---	---

2.2.4 LED Descriptions

LED	Color	State	Description
PWR	Green	ON	The module is powered up
		OFF	The module is powered down
STA	Green	ON	The module is functioning and working in active state
		Flash	The STA LED will flash at 0.5Hz for 4s during initialization status.
ERR	Red	ON	Parameters data (configured by MOXIDE) is in an erroneous (corrupted) state
		Flash	the CPCONF (CP Configuration File) information is in an erroneous state
		OFF	the Parameters data and CPCONF information are both OK
DIA	Green	Flash	CP is processing the cyclic data with I/O
		OFF	No cyclic data with I/O
COM1	Green	Flash	Communication is taking place on COMA
		OFF	No communication on COMA
COM2	Green	Flash	Communication is taking place on COMB
		OFF	No communication on COMB

2.3 MX603-3010 CPE

2.3.1 Module Familiarization

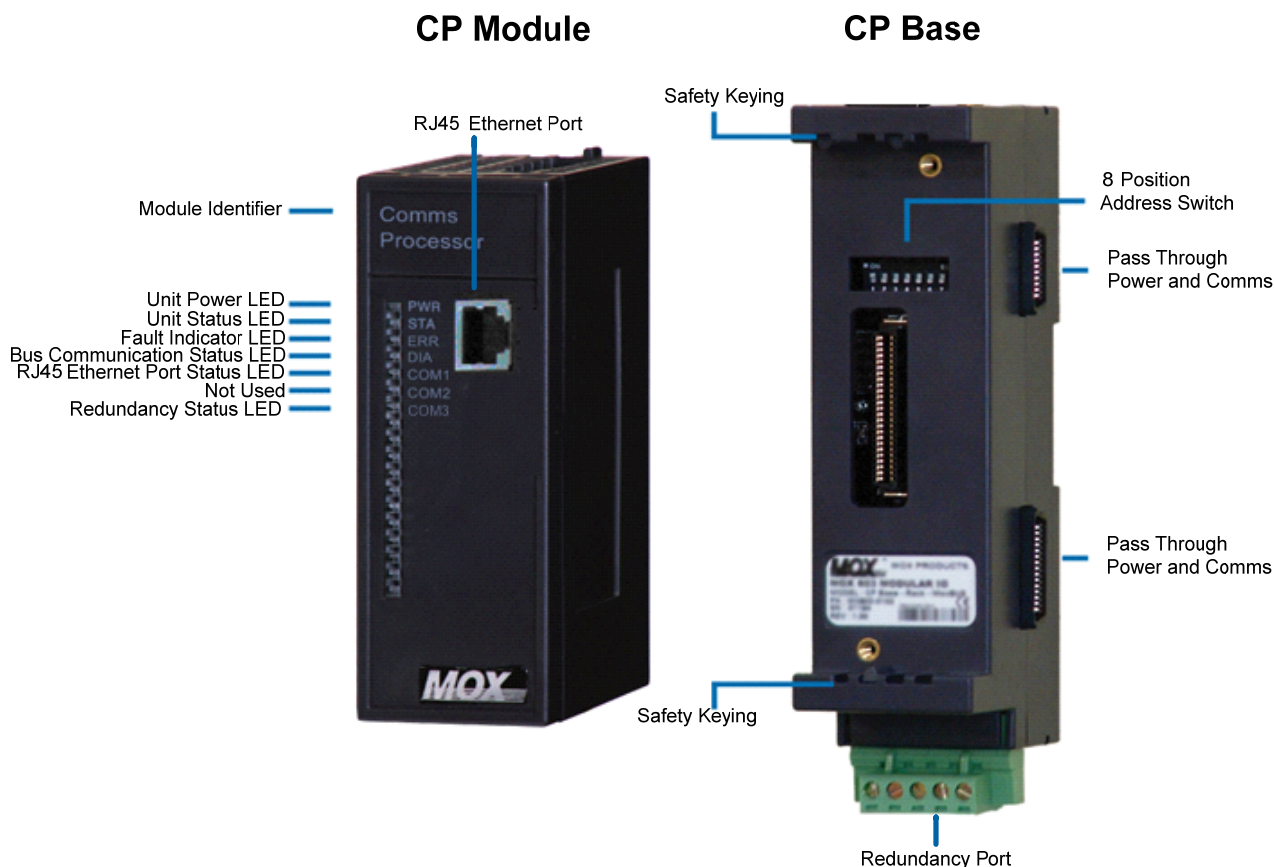


Figure 3 MX603-3010 Familiarization

2.3.2 Datasheet

Power	
Power dissipation	<2W
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing
Communications	
RJ45 Ethernet port	x 1 10/100Mbps
Others	
Supports hot-swap ability	Yes

Table 3 MX603-3010 Datasheet

2.3.3 Communication Ports

- One 10/100M Ethernet communication port

2.3.4 LED Descriptions

LED	Color	State	Description
PWR	Green	ON	The module is powered up
		OFF	The module is powered down
STA	Green	ON	The module works in active state to exchange cyclic data with the upper controller.
		OFF	The module is in configuration
		Flash at 0.5Hz	The module works in inactive state not exchanging any cyclic data with the upper controller.
ERR	Red	ON	Configured I/O module is in an erroneous state
		OFF	No error
		Flash at 0.5Hz	Configuration is faulty.
DIA	Green	ON	The module is communicating with the partner and got the response.
		OFF	The module is communicating with the partner but got no response.
		Flash at 0.5Hz	The module version does not match its partner, and could not work.
COM1	Green	ON	A physical connection via RJ45 port is established
		Flash	Communication is taking place with the host controller via RJ45 port
COM2	Green	N/A	COM2 LED is not used
COM3	Green	OFF	There is no transmitting/receiving activity on redundancy port
		Flash	There is transmitting/receiving activity on redundancy port



When the module in initialization, STA, ERR and DIA LED will turn ON for 1 second and then turn OFF.

2.4 MX603-3012 CPE

2.4.1 Module Familiarization

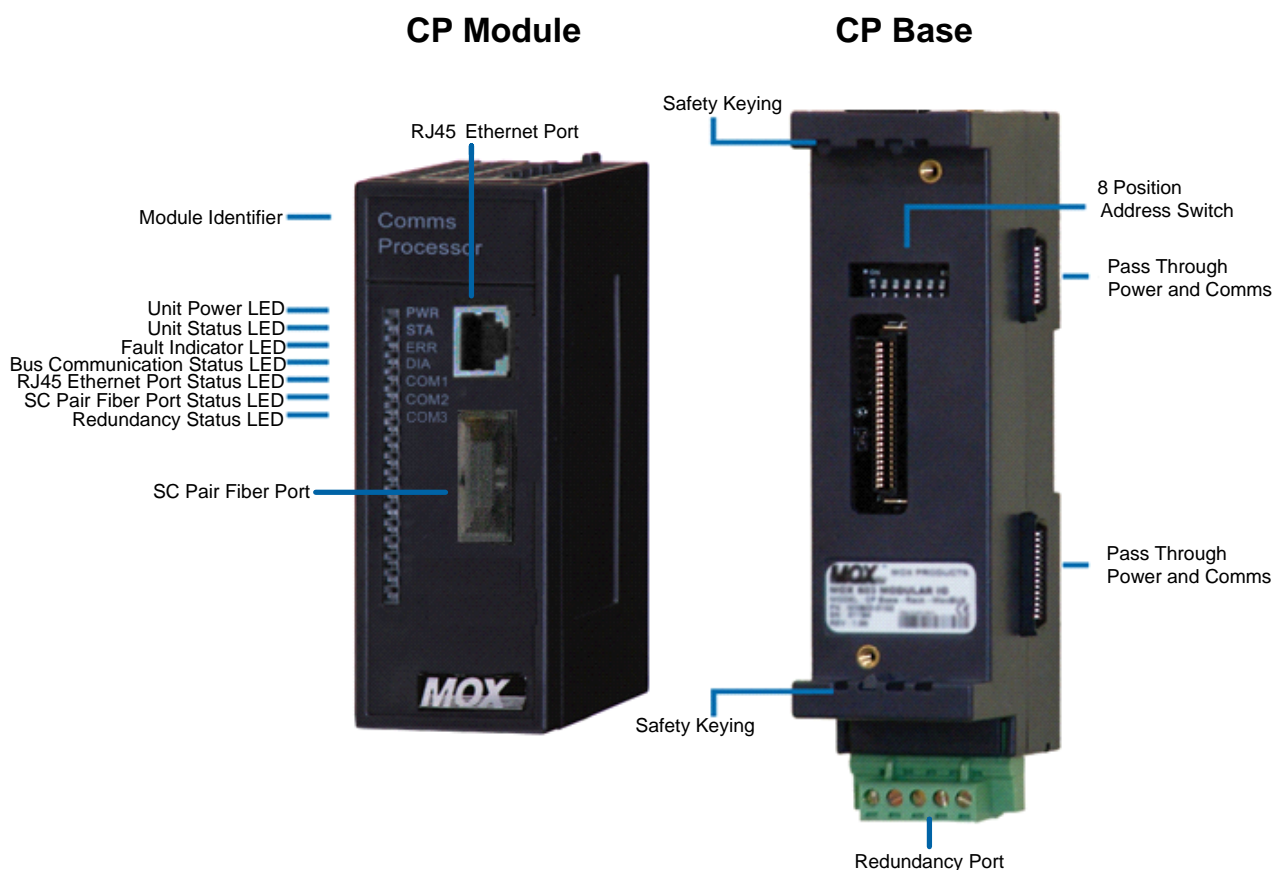


Figure 4 MX603-3012 Familiarization

2.4.2 Datasheet

Power	
Power dissipation	<4W
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing
Communications	
RJ45 Ethernet port	x 1 10/100Mbps
SC pair Fiber port	x 1
Others	
Supports hot-swap ability	Yes

Table 4 MX603-3012 Datasheet

2.4.3 Communication Ports

- One 10/100M Ethernet communication port – RJ45 port
- One Fiber communication port – SC pair port

2.4.4 LED Descriptions

LED	Color	State	Description
PWR	Green	ON	The module is powered up
		OFF	The module is powered down
STA	Green	ON	The module works in active state to exchange cyclic data with the upper controller.
		OFF	The module is in configuration
		Flash at 0.5Hz	The module works in inactive state not exchanging any cyclic data with the upper controller.
ERR	Red	ON	Configured I/O module is in an erroneous state
		OFF	No error
		Flash at 0.5Hz	Configuration is faulty.
DIA	Green	ON	The module is communicating with the partner and got the response.
		OFF	The module is communicating with the partner but got no response.
		Flash at 0.5Hz	The module version does not match its partner, and could not work.
COM1	Green	ON	A physical connection via RJ45 port is established
		Flash	Communication is taking place with the host controller via RJ45 port
COM2	Green	ON	A physical Fiber connection is established
		Flash	Fiber communication is taking place with the host controller
COM3	Green	OFF	There is no transmitting/receiving activity on redundancy port
		Flash	There is transmitting/receiving activity on redundancy port



When the module in initialization, STA, ERR and DIA LED will turn ON for 1 second and then turn OFF.

2.5 MX603-3014 CP Gateway

The CP Gateway is used by Open Controllers to access serial port devices. This increases the communications speed as the Open Controller will communicate with the data concentrator –CP Gateway, instead of each individual serial device.

2.5.1 Module Familiarization

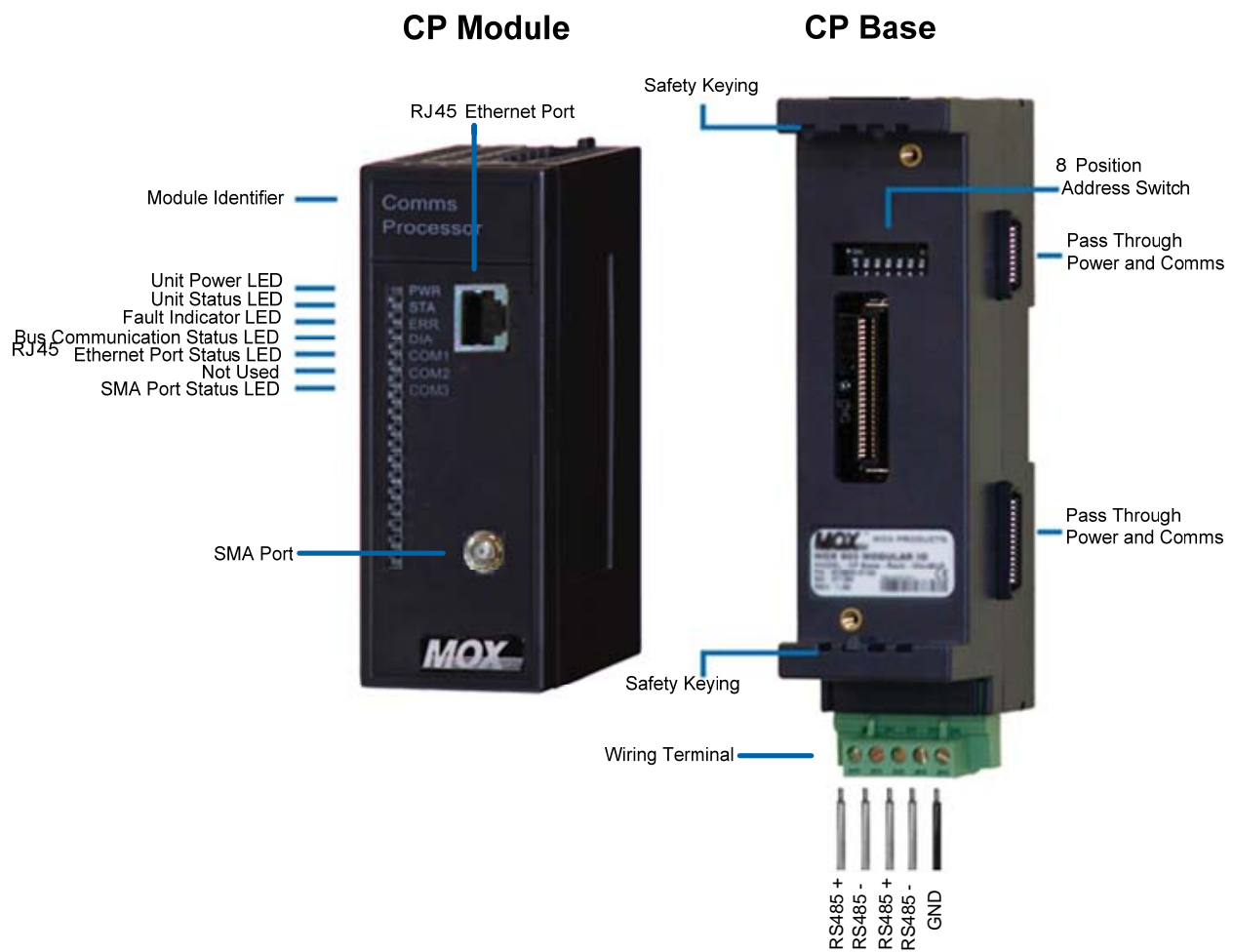


Figure 5 MX603-3014 Familiarization

2.5.2 Datasheet

Power	
Power dissipation	<3.5W
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing

Communications	
RJ45 Ethernet port	x 1 10Mbps
SMA MoxBUS port	x 1
RS485port	x 2 up to 11500bps
Others	
Supports hot-swap ability	Yes

Table 5 **MX603-3014 Datasheet**

2.5.3 Communication Port

- One 10BASE-T Ethernet communication port – RJ45 port
- One MoxBUS communication port – SMA port
- Dual RS485 multi-drop communication ports

2.5.4 LED Descriptions

LED	Color	State	Description
PWR	Green	ON	The module is powered
		OFF	the module is not operational
STA	Green	ON	CP Gateway is functioning normally
ERR	Red	ON	Parameters data (configured by MOXIDE) is in an erroneous (corrupted) state
		OFF	the Parameters data is OK
DIA	Green	ON	CP Gateway is working as the primary module
		Flash	the module is in standby
COM1	Green	ON	a physical Ethernet connection is established
		Flash	Ethernet communication is taking place with the host controller
COM2	Green	N/A	COM2 LED is not used
COM3	Green	Flash	MoxBUS communication is taking place with the host controller

3 Base and Power Supply

3.1 Base

The MOX Communications Processor modules mentioned in this document can work on the same base MX603-3105, regardless of the communications options provided.

The base is designed to provide cascading connection for multiple MOX I/O modules, however must be connected to a MOX 603 PSU module. The base can easily be identified by the use of rack-type female connectors fitted to the right side of the base and male connectors fitted to the left side.

The base offers a level of isolation by allowing pre-wiring of communications to the controllers. The CP module may then be plugged directly into the base after it has been installed. Physical guides on the module and the base with module safety keying allow the module to slide into the correct position quickly, safely and without damage to the module or base. This allows the user to insert or remove a module without the need to isolate the module power.

3.1.1 Familiarization

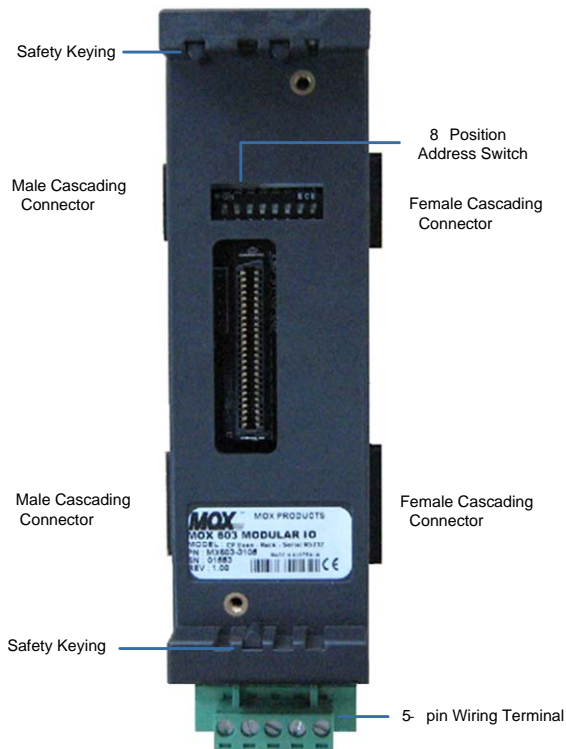


Figure 6 Base MX603-3105 Familiarization

3.1.2 Datasheet

Environmental Conditions	
Operating temperature	-20 to 70°C

Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing

Table 6 Base MX603-3105 Datasheet

3.1.3 Safety Keying

Keying each module type adds a level of safety to the installation of MOX CP modules into their base configuration.

Figure 7 and Figure 8 identify the keying code of base MX603-3105. Place the base on a flat surface, e.g. a table, and orientate the base to face directly away from you.

1 0 1 0

Figure 7 Keying Code for Base Top

0 1 0 0

Figure 8 Keying Code for Base Bottom

Figure 9 and Figure 10 identify the keying code of the MOX Communications Processor module. Orientate the module so that the front is facing you with the top of the module pointing up.

0 1 0 **1**

Figure 9 Keying Code for Module Top

1 0 1 1

Figure 10 Keying Code for Module Bottom

The highlighted keys are permanently attached to the module.

3.1.4 Address Switch

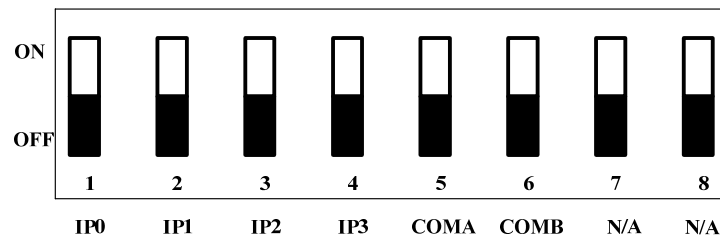


Figure 11 Assignments of the Address Switches

On the MX603-3105 base there is an 8-position address switch. The station number generated by first four bits (0 ~ 15) of the address switch, is used as the unique identification of each CP module in one communication network.

Station number 0 is special and should not appear in the normal configuration. It is used in diagnostic case to restore the communication settings of CP module to the factory default: IP address 192.168.199.16; serial port baudrate 9600, data bits 8, stop bits 1 and no parity.

The fifth and sixth bits are for bus termination:

- Switch the fifth switch ON to terminate the RS485 bus of COMA.
- Switch the sixth switch ON to terminate the RS485 bus of COMB



It is strongly recommended that all termination switches be OFF in most cases, whereas for long distance application, the switches on COMA and COMB at end of RS485 bus should be ON.

3.1.5 *Communication*

MOX Communications Processor modules support two communication buses in the rack base. The communications between the cascading modules is performed via either of these two buses.

3.1.6 *Compatibility*

All CP modules introduced in this document can only be used with base MX603-3015.

3.2 Power Supply Module

The MOX Communications Processor does not have its own power supply; as a result the MOX 603 PSU module MX603-4001 is used in conjunction with its designated base MX603-4101, to power the MOX Communications Processor and all subsequent cascading modules via the bases power bus.

The PSU module can provide over current protection.

3.2.1 Familiarization

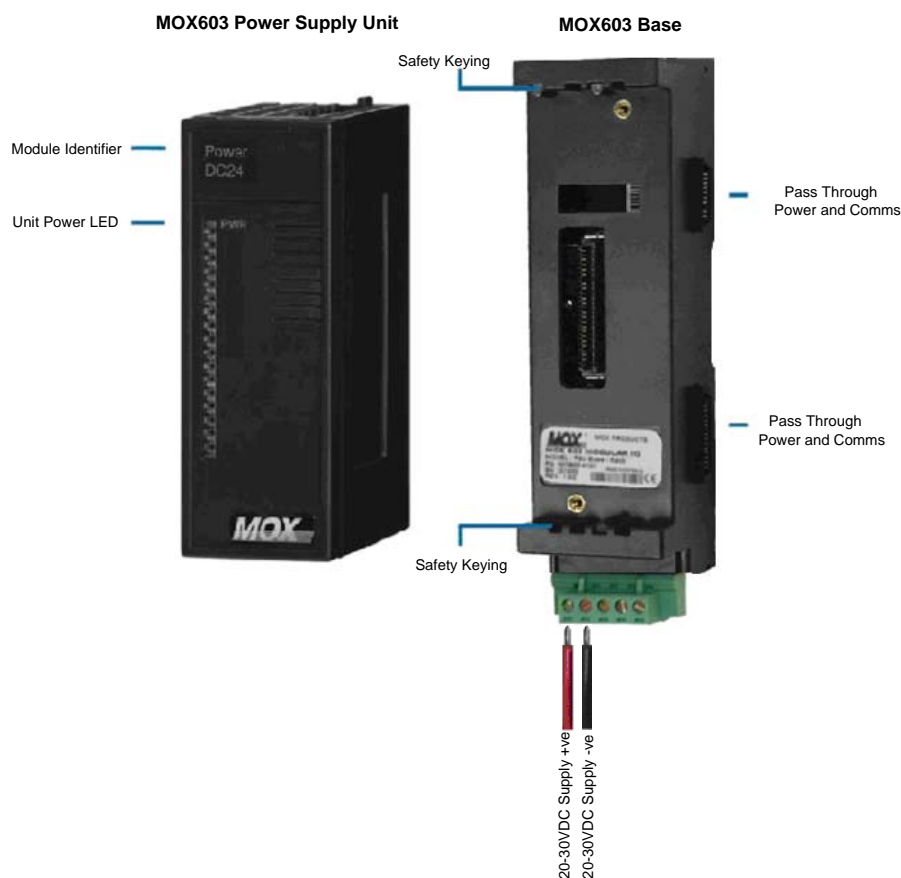


Figure 12 Power Module Components

The MX PSU module is powered by a user supplied DC voltage. This source should be in the range of 24VDC.



Please ensure the correct power voltage (24VDC) is supplied to MX 603 PSU module to ensure the power requirements of all connected modules are met.

3.2.2 Datasheet

Required Voltage	
Input voltage range	+20~+30VDC
Supply Voltage	
Rack-mode	+5VDC isolated
Output power	40W (8A @ 5V)
Ripple voltage	80mV
Protection	Reverse input
Efficiency	83%
Environmental Conditions	
Operating temperature	-20 to 70°C
Storage temperature	-40 to 85°C
Relative humidity	5 to 95%, non-condensing

Table 7 Power Supply Unit Datasheet

4 System Architectures



*For communication efficiency it is recommended that a maximum of **12** Communication Processor modules be connected to any one master controller, and a maximum of **10** I/O modules be connected to the Communication Processor in rack mode.*

4.1 Typical Connection via MOX OC

- 1) The following figures give a typical application of CPE modules via MOX OC.



Figure 13 Example System of CPE with Open Controller

- 2) The CP Gateway is used by Open Controllers to access serial port devices.

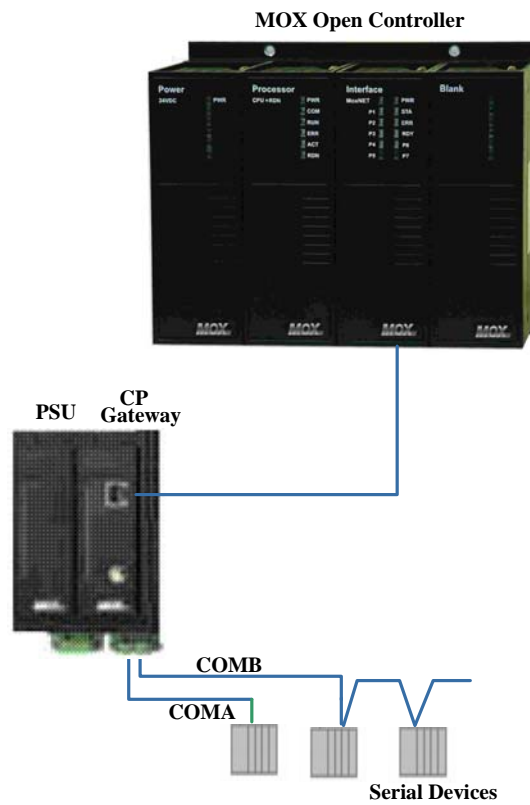


Figure 14 **Application of CP Gateway**

4.2 Typical Connection via MOX Unity

The following figures give a typical application of CP modules via MOX Unity.

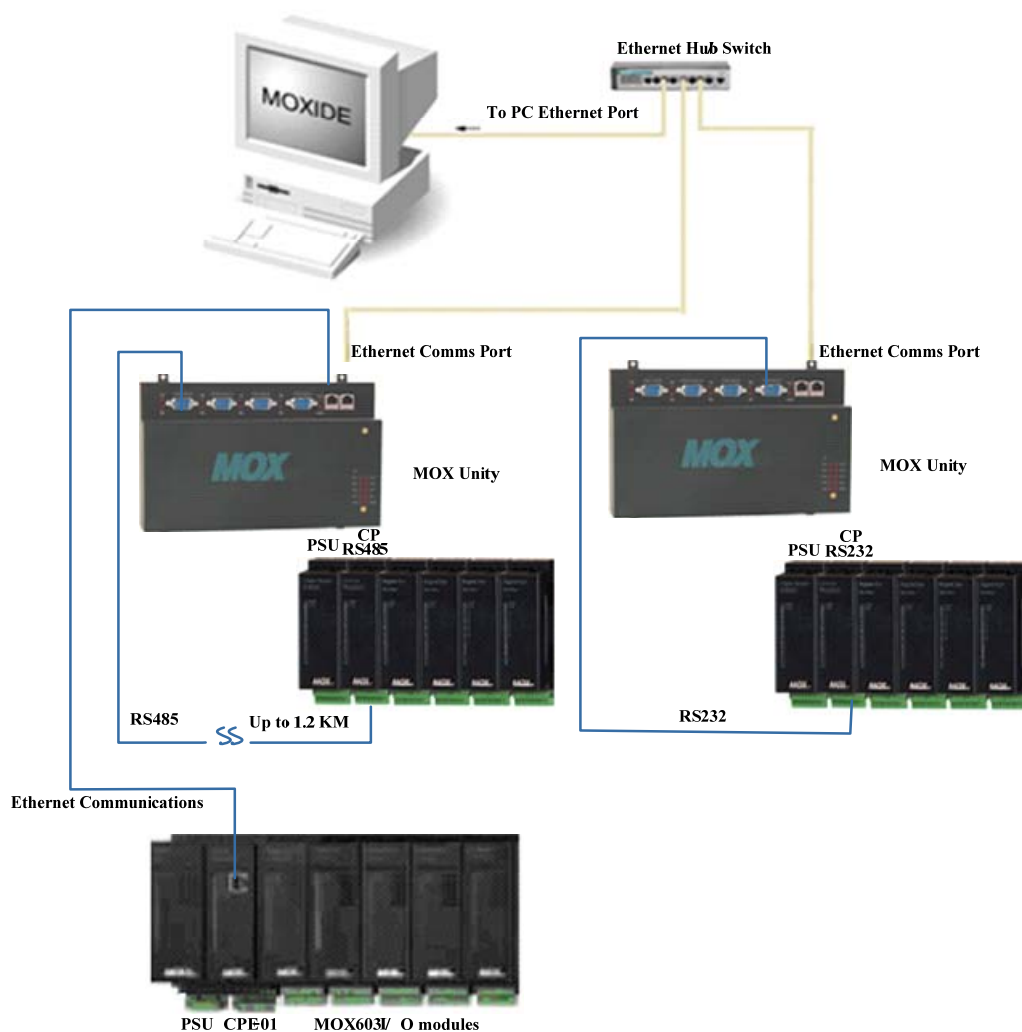


Figure 15 Example System of CP Modules with MOX Unity

4.3 Redundancy Connection

On start-up of a total redundant configuration, e.g. primary and standby MOX Controllers, the primary controller will take control over field operations as it has been allocated to do so. However if the primary controller should fail, the standby controller then takes control of the field operations. The primary and standby MOX Open Controller communicate with each other by fiber ports.

Two redundant MOX CP modules will be installed on same I/O rack and use identical station address.

Whichever controller is active depends on which CP is being used for I/O communications. However if one of the two redundant CP modules should fail on one or more of the I/O racks, communication to the active CP will be performed via the standby Open Controller. Once the damaged CP module has been repaired and placed back into service, communication with the I/O rack will then be performed via the active Open Controller.

The following typical application shows how CPE modules redundancy works.

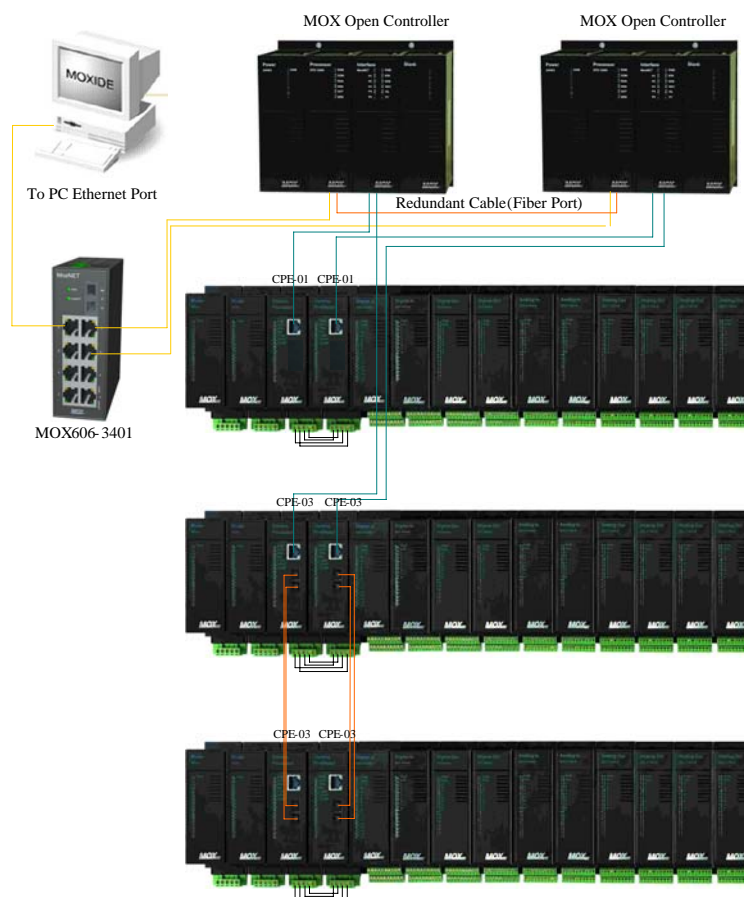


Figure 16 CPE Modules Redundancy Connectivity

The bases of the two redundant MOX CP modules on the same rack should be wired as shown in the following figure. No need to specifically change any software configurations of CPE for the redundancy application.

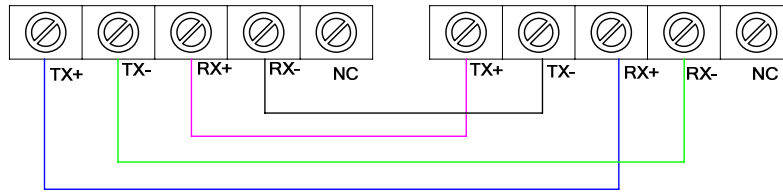


Figure 17 CPE Connection for Redundant Ports

The following typical application shows how CP Gateway module redundancy works. Both redundant CP Gateway modules may work as standby if there are no data requests from MOX host controller.

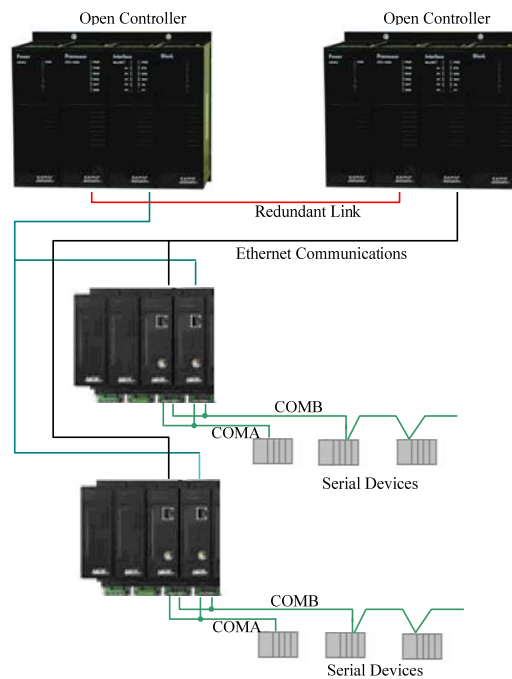


Figure 18 CP Gateway Redundancy Connection

5 Installation Considerations

5.1 Electrostatic Discharge

Integrated circuits or semiconductors may be severely damaged by electrostatic discharge. This may be caused if the terminal connector pins come in contact with an electro statically charged object such as hands or clothing. Follow these guidelines when you handle the module.

- Touch a grounded object to discharge static potential.
- Do not touch the terminal connector pins.
- Do not touch circuit components inside the unit.
- Always work with the unit on a grounded surface

5.2 Environmental Precautions

To extend the life of the MOX CP module, take the following precaution:

MOX CP modules have been designed for use in an industrial environment when installed in accordance with these instructions. Within this environment, the equipment is still intended for installation in a clean, dry environment.

5.3 Preventing Excessive Heat

For most applications, normal convective cooling keeps the controller within the specified operating range. The following should be considered to ensure that the specified operating range is maintained.

- Recommended spacing between the adjacent racks of I/O modules is 200mm minimum. This prevents much heat influence between the racks, and allows room for wire ducting to be installed without obstructing field wiring installation.
- If particularly high or low ambient temperatures occur, additional cooling or heating provisions should be provided.
- In some applications, a substantial amount of heat is produced by other equipment inside or outside the enclosure. In this case, place blower fans inside the enclosure to assist in air circulation and to reduce "hot spots" near the controller.
- Do not bring unfiltered outside air into the enclosure. Place the CP module in an enclosure to protect it from a corrosive atmosphere. Harmful contaminants or dirt could cause improper operation or damage to components. In extreme cases, you may need to use air conditioning to protect against heat build-up within the enclosure.

5.4 Installation Cleanliness

During installation and placement of items within the cabinet, do not install any components until all drilling is complete. Also, strip and trim cables well away from the MOX I/O. Be sure that debris (metal chips, wire strands, etc.) does not fall into the MOX I/O. Such debris could cause damage on power-up. Once wiring is complete, ensure that the unit is free of all metal fragments and other objects that may interfere with correct operation.


5.5 Power Isolation

When removing power from the device, interruption of the DC side of the power supply is preferred. This avoids the additional discharge delay of the power supply if the AC line is connected.

Always fuse the AC line of the power supply and place the main power isolation switch where operators and maintenance personnel have quick and easy access to it. If you mount an isolation switch inside the controller enclosure, place a handle on the outside of the enclosure to switch the isolator, so that you can disconnect power without opening the enclosure.

5.6 Terminal Connectors

Ensure all power sources, including the MOX I/O unit supply and field I/O supply, are isolated from the terminal connector before removing or inserting the terminal connector.

	<p><i>Always isolate the supply power before removal or insertion of the connector. When you remove or insert the connector with power applied, an electrical arc may occur.</i></p>
---	--

An electrical arc can cause personal injury or damage to property by:

- Sending an erroneous or excessive signal to your system's field devices
- Causing damage to the product through line spikes
- Cause excessive wear on module contacts due to the electrical arcing
- Create electrical resistance from worn contacts

5.7 DIN Rail Specifications

Ensure the DIN rail matches the dimensions of DIN EN 50022 provided as follows.

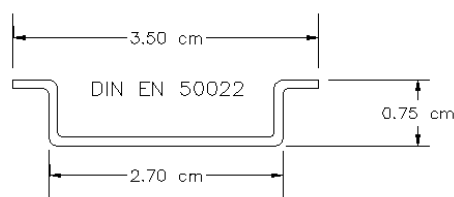


Figure 19 **DIN Rail EN 50022**

The spacing of the adjacently installed DIN rail in a cabinet must be great enough to secure minimum 200mm vertical spacing of I/O modules mounted.



End brackets are required for each end of DIN rail, to eliminate sparks caused by loose connection between rack bases of I/O.

5.8 Cable Path Considerations

When installing communications cables, the path of the cables should be planned to avoid electrical interference. Follow these guidelines to reduce electrical interference:

- Keep the communication cable at least 1.52 m from any electric motors, transformers, rectifiers, generators, arc welders, induction furnaces, or sources of microwave radiation.
- If you must run the cable across power feed lines, run the cable at right angles to the lines.
- If you do not run the cable through a contiguous metallic wire way or conduit, keep the communication cable at least 150 mm from AC power lines of less than 20A, 300 mm from lines greater than 20A, but only up to 100 kVA, and 600 mm from lines of 100 kVA or more.
- If you run the cable through a contiguous metallic wire way or conduit, keep the communication cable at least 80 mm from AC power lines of less than 20A, 150 mm from lines greater than 20A (but only up to 100 kVA), and 300 mm from lines of 100 kVA or more.

Running the communication cable through conduit provides extra protection from physical damage and electrical interference. If you route the cable through conduit, follow these additional recommendations:

- Use ferromagnetic conduit near critical sources of electrical interference. You can use aluminum conduit in non-critical areas.
- Use plastic connectors to couple between aluminum and ferromagnetic conduit. Make an electrical connection around the plastic connector (use pipe clamps and the heavy gauge wire or wire braid) to hold both sections at the same potential.
- Ground the entire length of conduit by attaching it to the building earth ground.
- Do not let the conduit touch the plug on the cable.
- Arrange the cables loosely within the conduit. The conduit should contain only serial communication cables.
- Install the conduit so that it meets all applicable codes and environmental specifications.

5.9 Ethernet Cabling to Ethernet Devices

Make Ethernet patch leads and connect to an associated switch. Any Ethernet expansion modules such as I/O Modules should also be connected to a switch that appears on the same logical network.

If you are using Ethernet for general communications or for Device communications, install the correct cabling and peripherals. Refer to Ethernet standards documentation or the documentation for your Ethernet communication devices for more details. All rules covering IEEE802.3 Ethernet systems should be considered and followed to ensure successful communications.

5.10 Power Wiring

5.10.1 Power Requirements

The MOX I/O and user instrumentation loops may be powered from the MOX 603 Power Supply module. It accepts 24VDC. Applying an incorrect voltage to it may cause damage. Connect the mains power to the user supplied DC Power Supply Unit only. Make 24VDC power connections from the power supply to the respective MOX 603 Power Supply modules (as needed).

Ensure your power supply is sufficiently sized to suit the power requirements of your system. Ensure the power supply has adequate output capacity to supply all of the connected devices.

It may be more convenient to supply all of the devices in the same enclosure with a single MOX 603 Power Supply module. However, this is not essential.

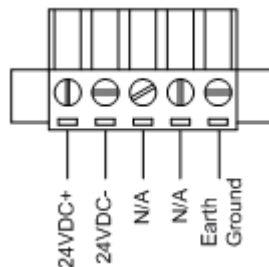
To calculate the current requirements, add the wattage required for the 603 I/O modules in use, then divide the total wattage by the DC power source voltage. Then add any current needed for user instrumentation loops.



To avoid electric shock or damage, power should only be applied after all wiring terminations are complete.

5.10.2 DC Power Wiring (User DC Source)

Make sure a good earth ground (minimum AWG18) is connected to the 'Earth Ground' terminal on the PSU base.



5.11 Applying Power

After all field wiring is installed, power up all MOX 603 Power Supply modules and connected MOX 603 I/O modules. Observe the status LED on each of the MOX Communications Processor modules. Normal Communications Processor start-up conditions will result in the following.

- 1) The power LED (PWR) will turn to the ON state, indicating that the unit is receiving a valid power input.
- 2) The status LED (STA) may be OFF or flash several times before remaining ON. Once STA is in solid ON state, the Operating System within the unit is functional and awaiting either communication requests or an update of inputs/outputs.

6 Software Configuration in MOXIDE

MOX CP module configuration capabilities have been built into the MOXIDE software. The following operations are supported:

- Configure and download parameters to CP
- Upload parameters of any connected CP or I/O module
- Upload CP variables Configuration and download it to the CP
- View diagnostic information of CP

This chapter of the user guide is intended to describe the configuration of the MOX CP and connected MOX I/O modules. For further information on configuration of the MOX OC or MOX Unity, please refer to the MOX Open Controller User Guide or the MOX Unity Field Controller User Guide.

For a more detailed description on the extended features of MOXIDE (MOX Integrated Development Environment), please refer to the MOXIDE User Guide.

6.1 MOXIDE Configurable Options of CP RS232/CP RS485/CPE

6.1.1 Parameters

The following chapter describes all possible parameter options available in CP Parameters page of MOXIDE.

MOX CP RS232

- MX603-3005

MOX CP RS485

- MX603-3007

Parameter	Options	Factory Default
Baudrate(COM A, B)	1200, 4800, 9600.....115200	9600
Data Bits(COM A, B)	7,8	8
Stop Bits(COM A, B)	1	1
Parity(COM A, B)	NO, ODD, EVEN	NO

MOX CPE

- MX603-3010
- MX603-3012

No user parameters required

6.1.2 Configuration

The MOX CP module needs to know the variable map and MODBUS addressing information of all connected I/O modules that it has to read from and write to. This information can be configured in CP Configuration page. This configuration of I/O module variables options is unique to each different I/O network configuration.

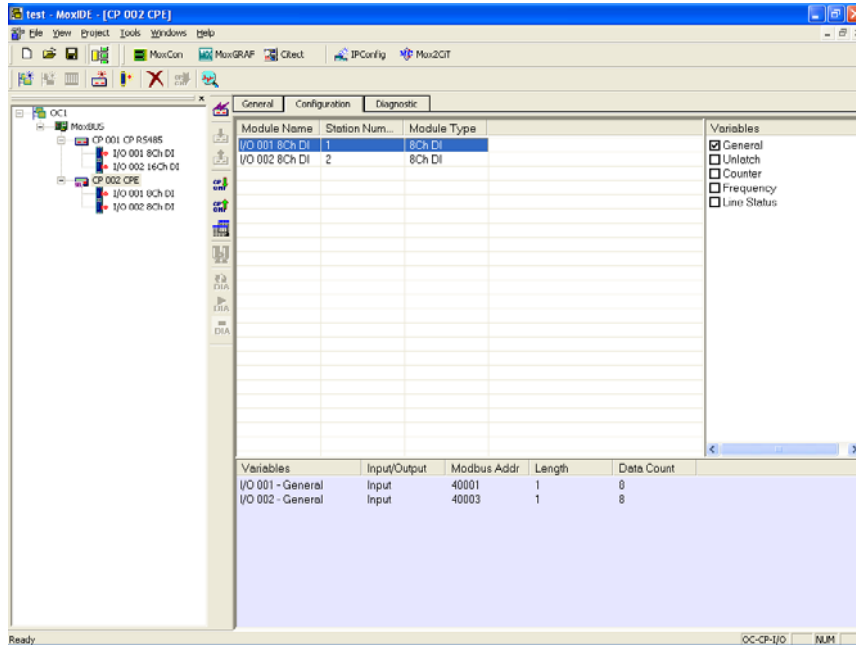



Figure 20 CP Configuration Page

The general Configuration Page consists of three separate windows. The main window displays the connected I/O modules with respect to the selected CP. The variables window displays the list of possible variables that can be set to read from or written to for the current selected I/O module. The third lower window displays the complete variable configuration to be downloaded to the CP.

By clicking icon  on the toolbar, the configuration file with all default I/O module variables can be downloaded to the CP module. This action is only available when the Configuration Page is selected for the specified module.

To set a different combination of variables for the connected I/O modules, select the desired module in the main window. Check the respective check boxes in the variables window to add them to the CP configuration file. Once all desired variables have been selected for all I/O modules, select icon



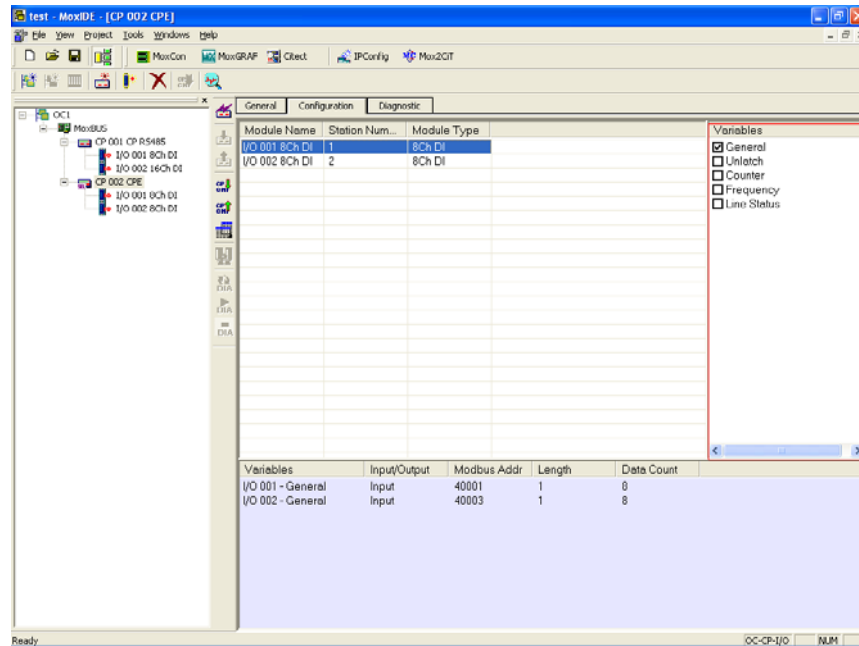
on the toolbar.



When an I/O module is added to the CP, a default variable configuration is updated in MOXIDE for that I/O module; however the new default variable configuration must still be downloaded to the CP.

When the variable configuration has been downloaded to the CP module, the module will scan the connected I/O at a certain rate.

Each I/O module type has a list of selectable variables that can be set and downloaded to the CP as shown in the following figure.



Each I/O module variable configuration is limited to a selection of a maximum of 6 variable options.

Refer to MOXIDE configuration page for detailed information about variable options of each MOX 603 I/O. The following are examples for typical I/O modules.

8 Channel Digital Input Module

The following MODBUS addressed variables can be communicated to via CP:

- General - default
- Counter - optional
- Frequency - optional
- Line status - optional

8 Channel Digital Output Module

The following MODBUS addressed variables can be communicated to via CP:

- General - default
- Line status - optional

8 Channel Analog Isolated Input 4-20mA Module

The following MODBUS addressed variables can be communicated to via CP:

- Analog (REAL) - default
- Input line status - optional

8 Channel Analog Output 4-20mA Module

The following MODBUS addressed variables can be communicated to via CP:

- General (REAL) - default
- Line status - optional

6.1.3 Diagnostic

The CP module also stores and dynamically updates diagnostic information concerning its runtime operation. This information can be chosen from CP Diagnostic page.

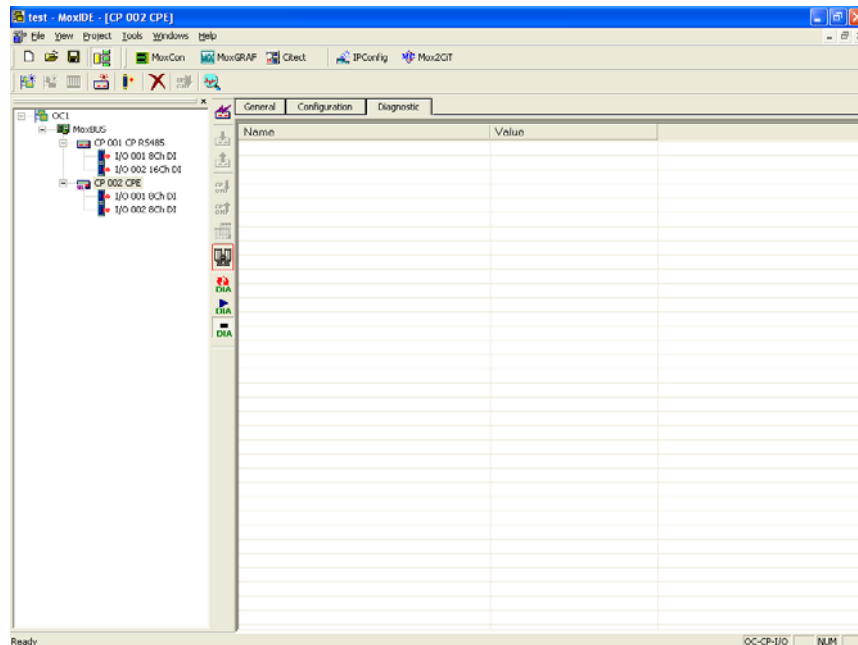



Figure 21 CP Diagnostic Page

By selecting icon , you can select desired diagnostic items on the popup window similar to the figure below

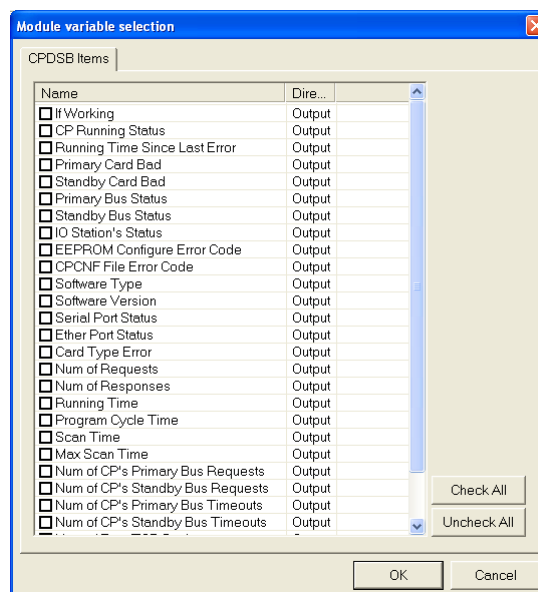


Figure 22 CP Diagnostic Items Selection

For CP modules except CP Gateway, detailed diagnostic items are illustrated as follows:

Item Name	Description
If Working	1: working 0: not working
CP Running Status	CP running status. 0: no error 1: extended memory error 2: bus error
Running Time Since Last Error	Running time when the last error of CP Status occurred. 0 ~ 4294967295
Primary Card Bad	0: normal 1: bad
Standby Card Bad	0: normal 1: bad 2: no standby
Primary Bus Status	0: normal 1: timeout
Standby Bus Status	0: normal 1: timeout
IO Station's Status	Each IO stations status. Based on CPCONF scan station sequence. 0: online 1: offline
EEPROM Configure Error Code	PARAMETERS configure error code. 0: no error 1: 0 addressed or CRC wrong 2: card type error 3: version conflicts 4: redundancy error 5: protocol error 6: bus using error
CPCONF File Error Code	CPCONF file error code. 1: file length wrong 2: file CRC wrong 3: file parameters wrong 11: file redundancy wrong 12: number of stations overflow 13: data offset wrong 14: IOVB overlap 20: station address overflows 21: station redundancy wrong 22: data types overflow 30: input or output type wrong 31: data area wrong 32: input data position wrong 33: output data position wrong 34: diagnostic data position error 35: data type wrong 36: data access selection wrong 37: scan mode wrong 38: scan line wrong
Software Type	100. MOX 603 CP
Software Version	4 unsigned char such as 1.0.0.0
Serial Port Status	0: no error and using 1: not to be used 2: can't be opened 3: no communication

Item Name	Description
Ether Port Status	0: no error
Card Type Error	0: no error 255: PARAMETERS CRC check error 254: type isn't defined 253: version error Other value: type is error
Number of Requests	0 ~ 4294967295
Number of Responds	0 ~ 4294967295
Running Time	0 ~ 4294967295
Program Cycle Time	0 ~ 4294967295
Scan Time	0 ~ 4294967295
Max Scan Time	0 ~ 65535
Num of CP's Primary Bus Requests	0 ~ 4294967295
Num of CP's Standby Bus Requests	0 ~ 4294967295
Num of CP's Primary Bus Timeouts	0 ~ 65535
Num of CP's Standby Bus Timeouts	0 ~ 65535
Num of Free TCP Sockets	0 ~ 255
Num of Listening TCP Sockets	0 ~ 255
Num of Connecting TCP Sockets	0 ~ 255

Table 8 Diagnostic Information Format

6.2 Configuration Procedure of CP RS232/CP RS485/CPE

It is possible to configure the CP module in three ways by MOXIDE depending on communications options:

- Configure the CP module from MOXIDE via a MOX Open Controller
- Configure the CP module from MOXIDE via MOX Unity
- Configure the CP module directly from MOXIDE

6.2.1 *Configuring a MOX CP Module via MOX OC*

In most cases a host controller, i.e. MOX Open Controller, will be incorporated within the system like diagram shown below:

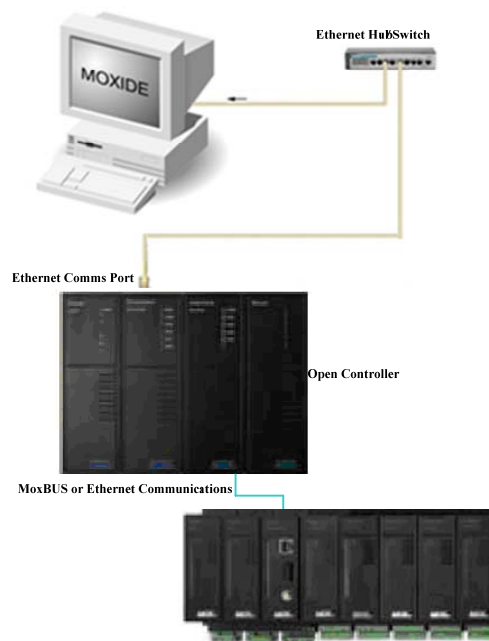


Figure 23 MOXIDE and MOX CP

When system hardware is connected, please follow steps below to start software configuration.

- 1) Open MOXIDE from the shortcut located on the PC desktop.
- 2) Create a new project using the “**Connect via OC and CP to IO**” network frame.
- 3) Add a new OC to the system.
- 4) Scan the network architecture for an automatic software configuration, or create new CP and I/O manually. When creating new CP and I/O manually, be sure to select the correct part number.



Ensure the first connected MOX I/O module has the station address “1” and that there are no address gaps in the following modules, e.g. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

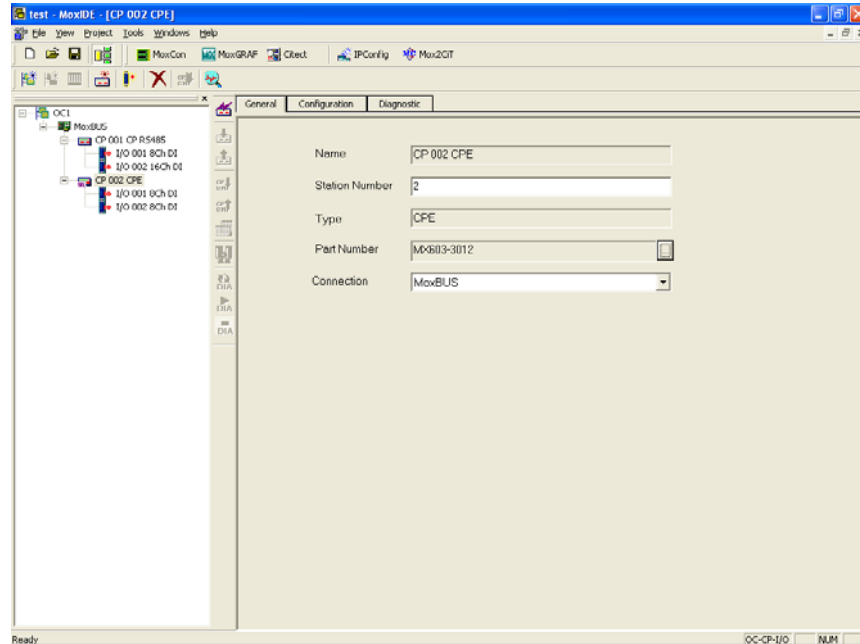


Figure 24 Network Architecture

- 5) Alter the configuration of any of the I/O modules on Parameters Pages, download it to the selected module by selecting icon on the toolbar.

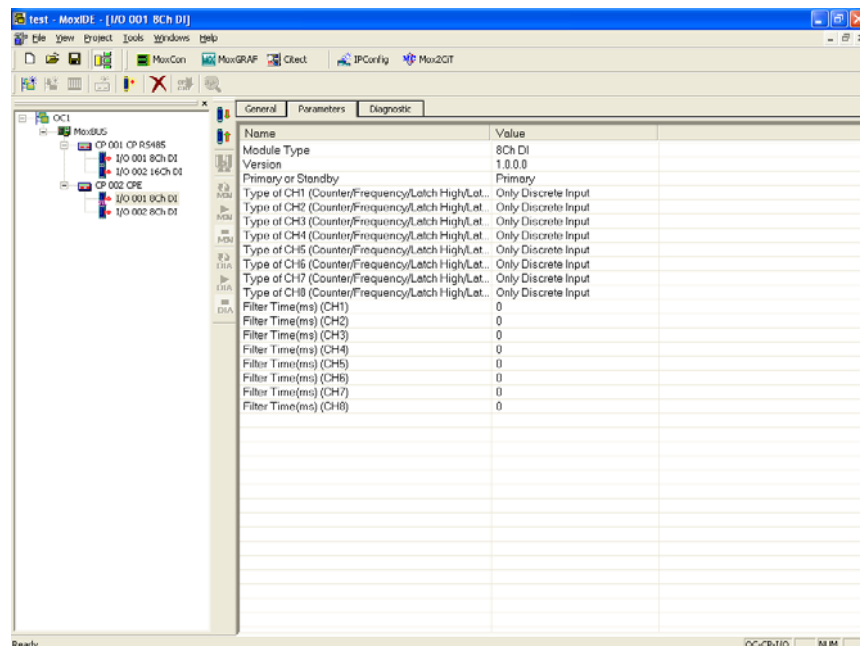



Figure 25 Download I/O Parameters

- 6) Check the desired I/O variables and download the configuration to the CP module by selecting icon .

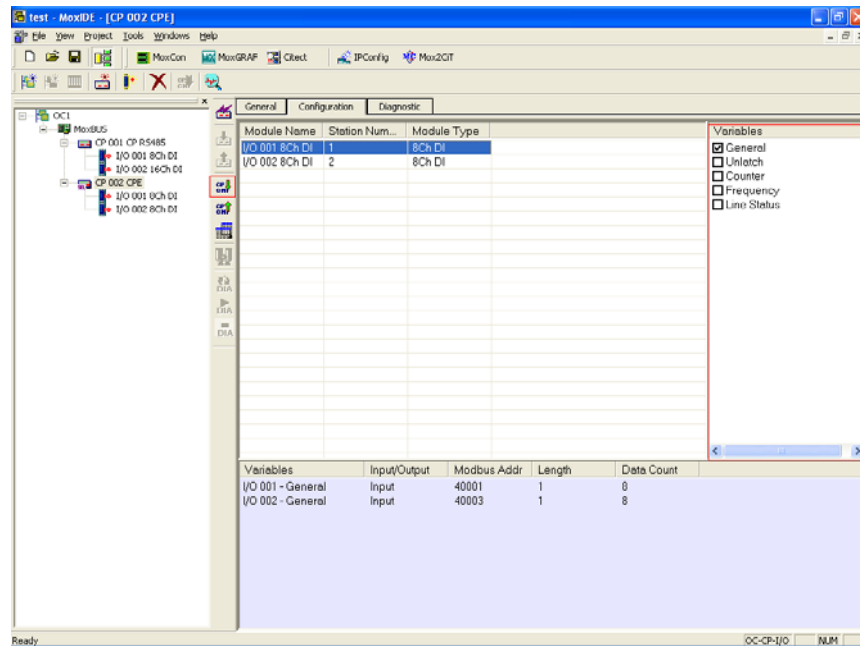


Figure 26 Download I/O Variable Configuration

If the variable configuration has been downloaded to the CP, the CP module is ready to scan the connected I/O at the request of the connected host controller

The MOX CP & I/O rack is now configured and ready to communicate with MOX Open Controller.

6.2.2 *Configuring MOX CP Module via MOX Unity*

In cases where CP module is being connected with a MOX Unity, the configuration process is similar to that via MOX OC except that you should choose **“Connect via RTU and CP to I/O”** network frame when creating new project and add a new RTU to the system as the root node of network architecture.

Note that when you choose to add the CP manually, please make sure to select correct Part Number and Connection option in General page.

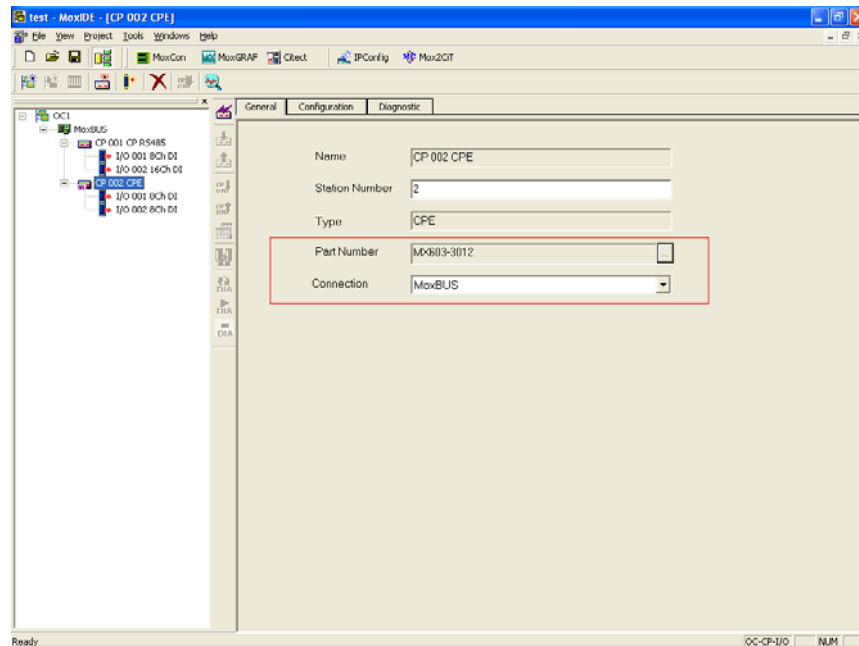


Figure 27 Add New MOX CP

6.2.3 *Directly Configuring MOX CP*

CP can be configured directly from MOXIDE. Take process via MOX OC as a reference, and pay attention to select **“Connect via CP to I/O”** network frame when creating new project and add a new CP module as the root node of the network architecture.

Be sure to select the correct part number and connection option used to communicate with the MOX CP module when you add new CP modules. MOXIDE uses Ethernet as default connection.

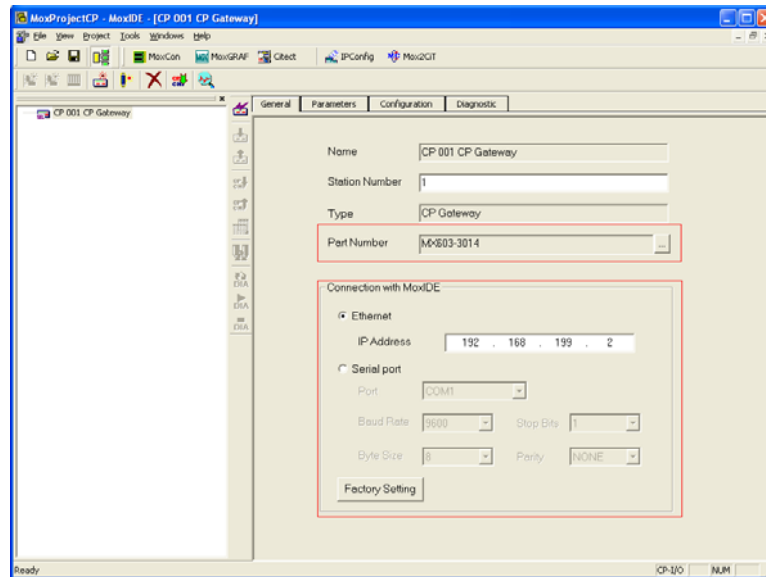


Figure 28 Add New MOX CP



The default communication parameters of the new MOX CP module include:

- *Serial - Baud rate - 9600 bps, Data bits-8, Stop bits-1, Parity – NONE*
- *Ethernet - 192.168.199. XXX (where XXX is the station address of the CP module)*

6.3 MOXIDE Configurable Options of CP Gateway

6.3.1 Parameters

The following chapter describes all possible parameter options available in CP Gateway Parameters page of MOXIDE.

Parameter	Options	Default
Protocol (COM A, B)	MODBUS Master MODBUS Slave MODBUS Master MODBUS Slave Transparent	MODBUS Master
Timeout (COMA,B)(ms)	User defined	200
Delay (COMA,B)(ms)	User defined	0
Start Addr (Diagnostic MODBUS)	User defined	9500
MODBUS Group	User defined	0
Address (MODBUS Group1-9)	User defined	0
Point (MODBUS Group1-9)	User defined	0
Fail-safe Value (MODBUS Group1-9)	User defined	Last Value
Timeout (MODBUS Group1-9)	User defined	3000
Baud rate (COM A, B,)	1200, 2400, 4800, 9600, 19200, 38400, 5600, 57600, 115200, 12800, 256000	9600
Data bits (COM A, B)	7, 8	8
Parity (COM A, B)	NO, ODD, EVEN,	NO

Table 9 CP Gateway Parameters

The CP Gateway accesses serial device data with MODBUS or a derived transparent protocol via two serial ports - COMA and COMB. The two ports can be used simultaneously. Each port can access MODBUS Master, MODBUS Slave or Transparent serial devices separately.

COMA is used as default if no serial port information is specified from OC side.

The IP address of CP Gateway is 192.168.199. XXX , where XXX is the station address.

➤ Protocol (COMA,B)

Each serial port must be configured with a communications protocol. The CP Gateway can act as either a master or a slave by selecting the protocol from a few different options.

- MODBUS Master

- MODBUS Slave
- MODBUS Master
- MODBUS Slave
- Transparent

If MODBUS Master or MODBUS Master is chosen for the port, the module acts as a master. CP Gateway only transforms and transfers request/response and there is no local MODBUS Group data in this case. CP Gateway processes packets one by one, the new request will be discarded if CP Gateway is still process the last request.

A typical application of CP Gateway acting as master is shown as following figure. The Open Controllers communicates with CP Gateway via the Ethernet port using ModNetM function block. The ModNetM function block is used to access MODBUS data from MODBUS serial device (Refer to the Special Function Block Programming Guide for more information). Both the IP address of CP and station number of MODBUS serial devices should be defined by ModnetM on OC side.

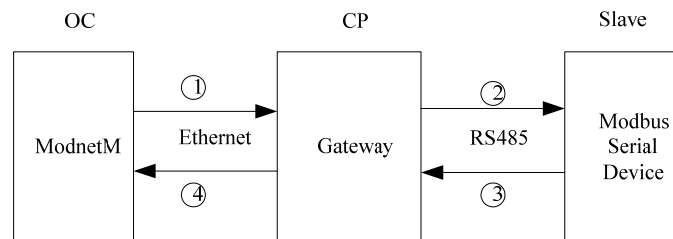


Figure 29 Access MODBUS Slave

If MODBUS Slave or MODBUS Slave is chosen for the port, the module acts as a slave, it exchanges data with host controller or MODBUS serial device using local MODBUS Group data. The parameter "MODBUS Group" must be more than one in this case.

A typical application of CP Gateway acting as slave is shown as following figure. The Open Controller or the MODBUS serial device i.e. a touch screen can read or write the MODBUS Group data area on CP Gateway for data exchanging. The CP Gateway communicates with the OC and the serial device separately. The IP address of CP will be used by ModnetM on OC side while the CP station number will be used by MODBUS serial device.

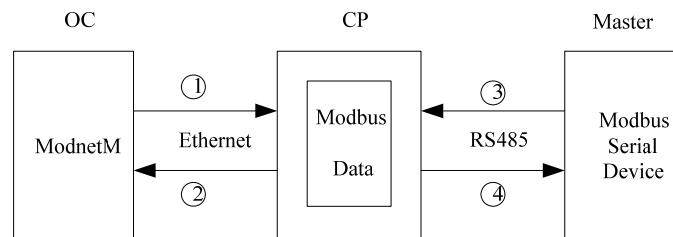


Figure 30 Access MODBUS Master

If Transparent is chosen for the port, CP Gateway can access Transparent serial devices.

A typical application of CP Gateway accessing Transparent serial devices is shown below. The Open Controller communicates with CP Gateway via the Ethernet port using Eth2Com function block.

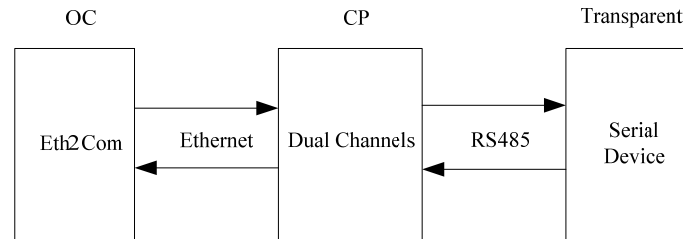


Figure 31 Access Transparent Serial Devices

Each port also has communication timeout and delay parameters which can be altered for desired operation:

➤ **Timeout (COMA,B)**

The timeout parameter (ms) is the time duration the module will wait for a response from the connected device, the default is 200ms.

- 0~65535

➤ **Delay (COMA,B)**

The delay is the time delay for sending response to the connected devices, when using default value zero, response will be sent straight away.

- 0~65535

➤ **Start Address (Diagnostic MODBUS)**

Holding registers are used for CP Gateway to store diagnostic and statistical information. The start address offset is identified by this parameter. It is recommended to use default value 9500.

- 1~9899

CP Gateway uses local MODBUS protocol to communicate with OC and serial devices when either port is set as MODBUS Slave/MODBUS Slave. In this case, MODBUS group and their parameters must be set correctly:

- MODBUS Group
- Point
- Address
- Timeout
- Fail-safe Value

➤ **MODBUS Group**

CP Gateway supports the maximum of nine groups of MODBUS variables for the master devices to access.

- 0~9

➤ **Point (MODBUS Group1-9)**

This parameter is the number of points (registers) per MODBUS group. The maximum number for each group is 100.

- 0~100

It is strongly recommended to use as few groups as possible. Multiple groups are only needed in following cases: having different register types or continuing register points exceed 100.

➤ **Address (MODBUS Group1-9)**

For each address group the following address ranges apply:

- Coil status: 00001 - 09999
- Holding register: 40001 - 49999

MODBUS address range of different groups should not overlap. Also user should not access MODBUS address crossing multi-groups with only one request.

If OC or serial device writes MODBUS data to CP with an address beyond proper range, the data will be discarded. If OC or serial device reads data with incorrect address from CP, default value 0 will be returned.

➤ **Timeout (MODBUS Group 1-9)**

This parameter defines a time frame. If MODBUS data is not updated during the specified time frame, the data will be considered to be invalid. The default is 3000ms.

- 0~65535

➤ **Fail-safe Value (MODBUS Group 1-9)**

- Last Value: Retained invalid data
- Don't respond: No response

If the data is invalid, the CP Gateway module will give no response or just feed retained invalid data back to the connected MODBUS device according to user's setting on this parameter.

➤ **Port Number**

Port Number is TCP server port for Modnet slave and the Port Number plus one is for UDP. The default value is 502 which mean using 502 for TCP and 503 for UDP. Please set this value with care, incorrect setting will result in a port conflict. It is recommended to use the default value.

6.3.2 Configuration

CP Gateway is not used to connect with MOX 603 I/O modules, so variable configuration in Configuration Page of MOXIDE is not necessary.

6.3.3 Diagnostic

The CP Gateway also stores and dynamically updates diagnostic information concerning its runtime operation. This information can be chosen from CP Diagnostic page.

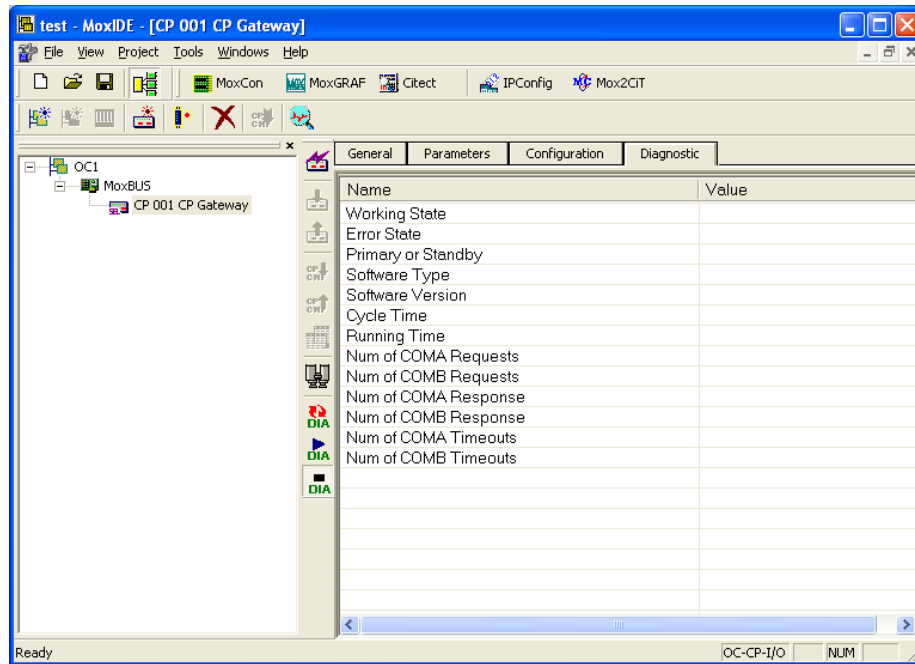



Figure 32 CP Gateway Diagnostic Page

By selecting icon , you can select desired diagnostic items on the popup window similar to the figure below

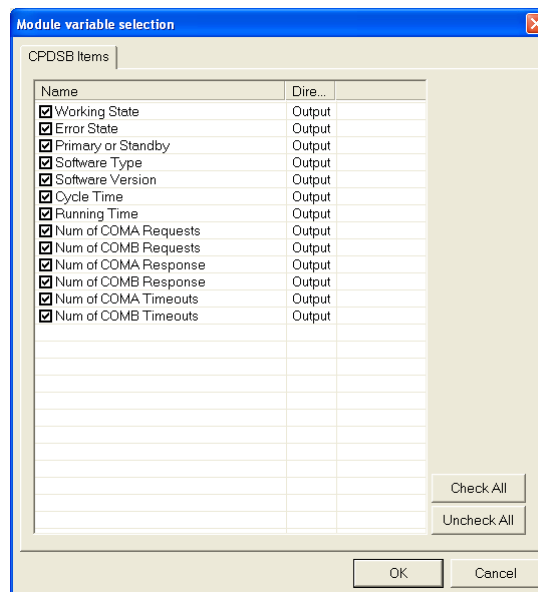


Figure 33 CP Gateway Diagnostic Items Selection

Detailed diagnostic items are illustrated as follows:

Item Name	Description
Working State	Unsigned char 0: unworking

	1: working
Error State	Unsigned char 0: no error 1: error
Primary or Standby	Unsigned char 0: standby 1: primary
Software Type	102, MOX 603 CP Gateway
Software Version	4 unsigned char such as 1.0.0.0
Cycle Time	One circle period (ms)
Running Time	CP running time (s)
Num of COMA Requests	Number of requests on COMA
Num of COMB Requests	Number of requests on COMB
Num of COMA Response	Number of responses on COMA
Num of COMB Response	Number of responses on COMB
Num of COMA Timeouts	Number of timeouts on COMA
Num of COMB Timeouts	Number of timeouts on COMB

Table 10 CP Gateway Diagnostic Information

6.4 Configuration Procedure of CP Gateway

In most cases MOX Open Controller is used within the system to access serial port devices like Figure 14. It is possible to configure the CP Gateway module from MOXIDE via a MOX Open Controller

After system hardware is connected, follow below steps to start software configuration.

- 1) Open MOXIDE from the shortcut located on the PC desktop.
- 2) Create a new project using the “**Connect via OC and CP to IO**” network frame.
- 3) Add a new OC to the system.
- 4) Scan the network architecture for an automatic software configuration, or create new CP Gateway manually.

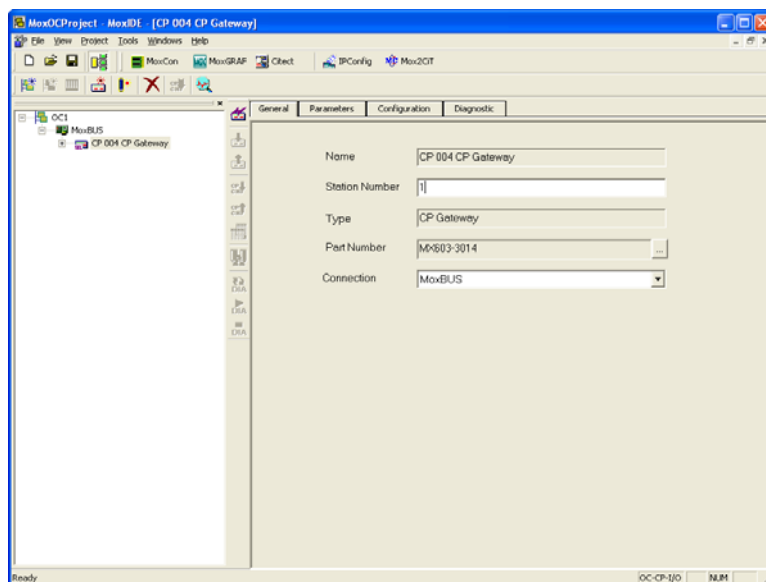



Figure 34 Network Architecture

- 5) Select CP Gateway module from the network tree and select icon  located on the toolbar to upload the current Parameters configuration on the connected module. This will also ensure that communication with the module has been established. Note that this action is only needed when CP Gateway is created manually.

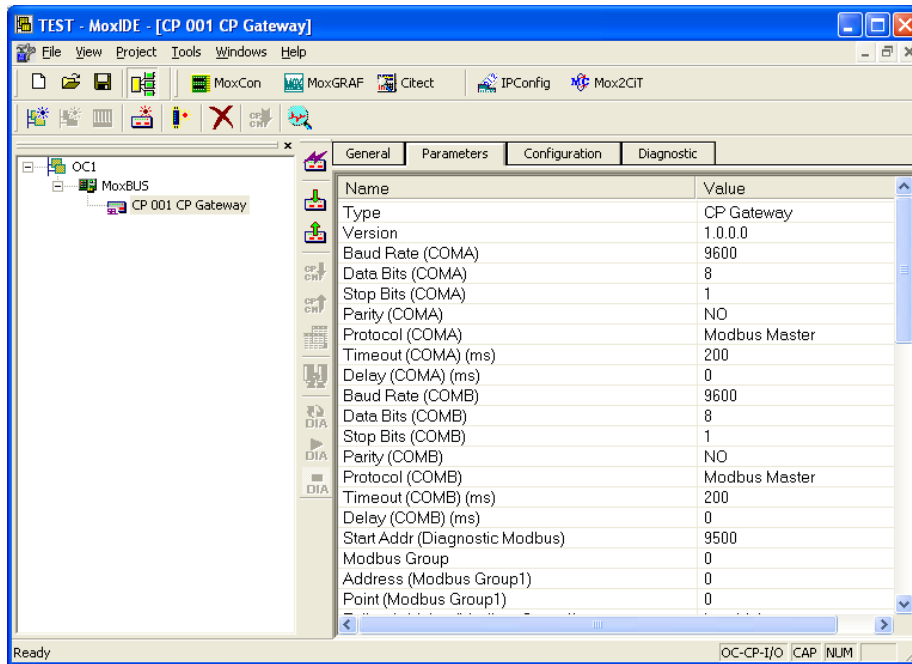



Figure 35 Upload Parameters

- 6) To reach the desired operational configuration, change required parameters of the module and then select icon  on the toolbar to download the new settings to the module. If a simple alteration of the operational abilities are being changed and nothing else, note that these parameters will not take affect after downloading them, ***the CP module must be restarted before the new parameters will take effect.***

The MOX CP Gateway is now configured and ready to communicate with MOX Open Controller.

Appendix A Product Support

Warranty Information

All MOX manufactured products are warranted to be free from defects in material and workmanship. Our obligation under this warranty will be limited to repairing or replacing, at our option, the defective parts within 1 year of the date of installation, or within 18 months of the date of shipment from the point of manufacture, whichever is sooner. Products may only be returned under authorization. The purchaser will prepay all freight charges to return any products with a valid return authorization number to the designated repair facility.

This limited warranty does not cover loss or damage that may occur in shipment of the goods or due to improper installation, maintenance, misuse, neglect or any cause other than ordinary commercial or industrial use. This limited warranty is in lieu of all other warranties whether oral or written, expressed or implied.

Liability associated with all MOX products shall not exceed the price of the individual unit that is the basis of the claim. In no event will there be liability for any loss of profits, loss of use of facilities or equipment or other indirect, incidental or consequential damages.

Contact Details

To obtain support for MOX products, call MOX Group on the following numbers or your designated support provider and ask for MOX Support.

E-mail addresses:

support@mox.com.au

sales@mox.com.au

Visit our web page at:

<http://www.mox.com.au>

Service Information

If you require service, contact your local MOX Group representative. A trained specialist will help you to quickly determine the source of the problem. Many problems are easily resolved with a single phone call. If it is necessary to return a unit, an RMA (Return Material Authorization) number will be provided.

All returned materials are tracked with our RMA system to ensure speedy service. You must include this RMA number on the outside of the box so that your return can be processed immediately.

Your MOX Group authorized applications engineer will complete an RMA request for you. If the unit has a serial number, we will not need detailed financial information. Otherwise, be sure to have your original purchase order number and date purchased available.

We suggest that you provide a repair purchase order number in case the repair is not covered under our warranty. You will not be billed if the repair is covered under warranty.

Please supply us with as many details about the problem as you can. The information you supply will be written on the RMA form and supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner. Most repairs are completed within two days. During busy periods, there may be a longer delay.

If you need a quicker turnaround, ship the unit to us by airfreight. We give priority service to equipment that arrives by overnight delivery. Many repairs received by midmorning (typical overnight delivery) can be finished the same day and returned immediately.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

For Your Convenience:

Please fill in the following information and keep this manual with your MOX system for future reference:

P.O. #: _____ Date Purchased: _____

Purchased From: _____



© 1999-2010 MOX Group, Australia. All rights reserved
Reproduction in whole or in part without permission prohibited
Features and specifications subject to change without notice
MOX, MOX and MOX_{GRAF} are trademarks of the manufacturer
ISaGRAF is the registered trademark of Altersys Inc, Canada
All other trademarks are the property of their respective owners

MOX Group

Web: www.mox.com.au
Email: info@mox.com.au