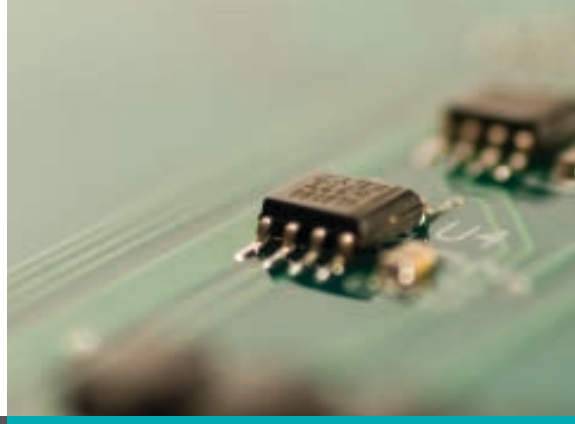
Technical Overview

MOX Field Controllers

Contents

Features



MOX Field Controllers are leading edge open-systems controllers with enhanced Remote Terminal Unit (RTU) capabilities for use in SCADA, telemetry and remote data monitoring applications. They have been designed from the ground up to interface with field devices and control equipment via any of the many leading communications methods available. The final solution is Enterprise ready allowing data from your remote sites to seamlessly flow into your SCADA application. MOX Field Controllers are truly open to quickly integrate into your existing systems.

A typical MOX Field Control station consists an AC to DC power supply, a MOX Field Controller and optional expansion I/O. The MOX Unity provides flexible I/O configurations for more specific applications and the MOX Gateway provides onboard communications modules for cross protocol information distribution.

MOX Field Controllers are supplied with up to six serial communications ports and three Ethernet ports. Certain MOX Field Controllers can also be fitted with an onboard GSM/GPRS, extending the communications capability of the unit even further. The I/O capacity of all MOX Field Controllers can be expanded with the inclusion of a number of MOX 603 I/O modules connected via serial, Ethernet or various Fieldbus protocols.

- **MODULAR CONSTRUCTION**
- **OPEN SYSTEMS INTERCONNECTION**
- **REDUNDANCY AVAILABLE AT EVERY LEVEL**
- **EXPANDABLE AND SCALABLE ARCHITECTURE**
- **ENTERPRISE READY SOLUTION**
- **INTEGRATED AND TRANSPORTABLE IEC61131 CONTROL SOFTWARE**
- **STANDARD MODBUS AND TCP/IP COMMUNICATIONS**
- **FUNCTIONS IN STAND ALONE OR INTEGRATED CONFIGURATIONS**
- **NUMEROUS ON-BOARD COMMUNICATIONS OPTIONS**

Leading edge open-systems Controllers with enhanced Remote Terminal Unit (RTU) capabilities.

MOX Unity 5021

MOX Unity 5201

MOX Unity 5223

MOX Unity 5423

PROFIBUS Gateway

Fieldbus Gateway

Applications

MOX Field Controllers may be utilised in traditional industries such as the water industry for monitoring remote stations such as weather stations and water level monitors, as well as control of pumping stations. However, the capability of these powerful controllers extends way beyond the traditional boundaries.

MOX Field Controllers are suitable for a wide variety of applications across a varied range of industries with their outstanding versatility, cost effectiveness, performance and a scalable architecture. MOX Field Controllers are found in the smallest irrigation controller or packaging machine to wide scale flood monitoring systems. A complete set of inbuilt functions for PID loop control allows the MOX Field Controller to be employed for advanced process control applications. MOX Field Controllers are also suitable for large gas management networks with inbuilt functions for AGA3, AGA7 and AGA8 gas flow calculations, and Hazardous Area Certification in some models.

MOX Field Controllers are designed with industry standards in mind and from the best available technology. Components are selected to allow for extreme environmental conditions giving the system operational capability in almost any location.

WATER AND WASTE WATER TREATMENT

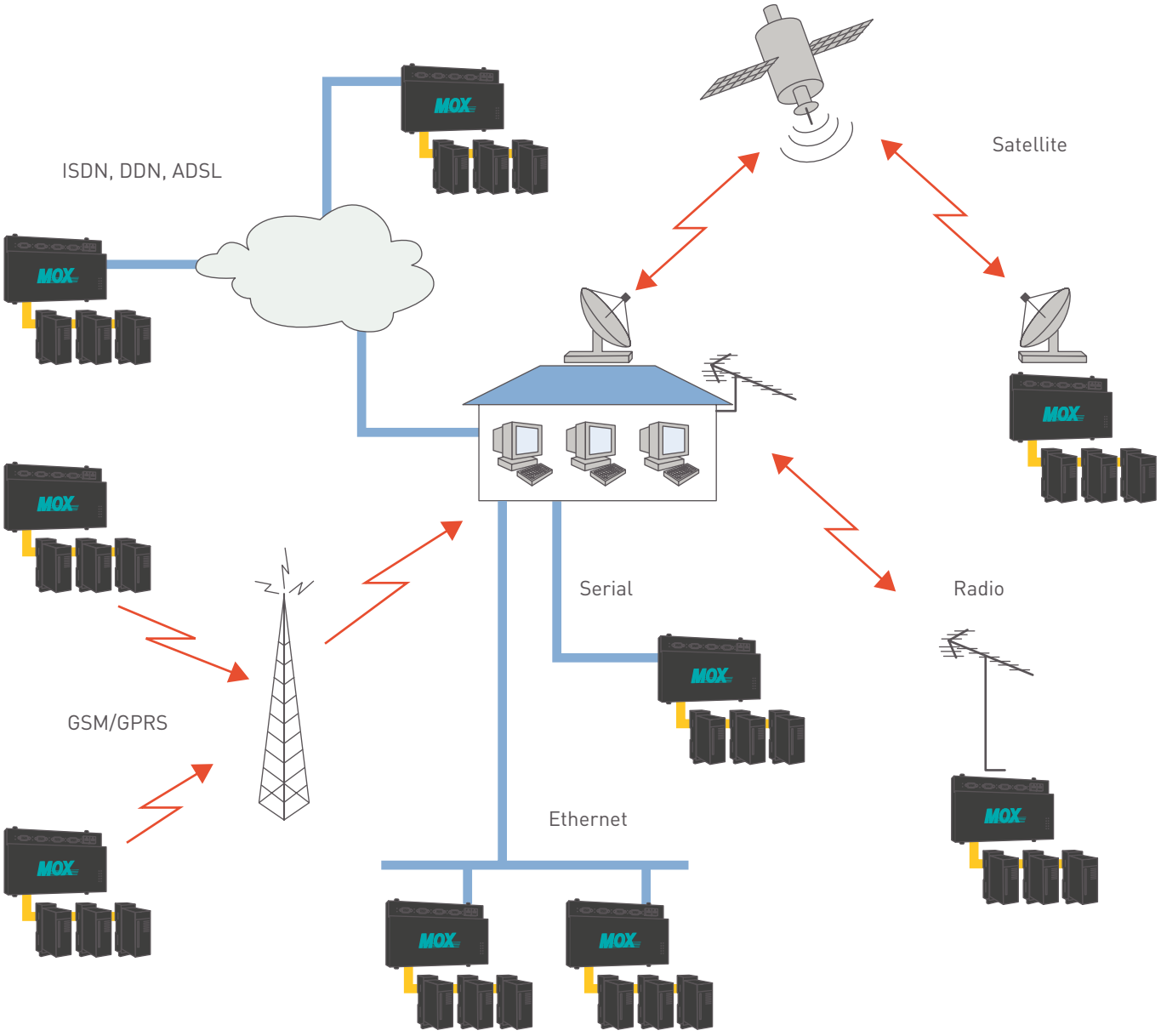
OIL, GAS AND WATER DISTRIBUTION AND RETICULATION

ELECTRICITY TRANSMISSION AND DISTRIBUTION

TRANSPORTATION CONTROL AND SIGNALING

PACKAGING AND WAREHOUSE CONTROL

MOX Field Controllers provide real time access to your operational and historic data and control of your system at both local and remote installations.



Unity

The MOX Unity delivers market-leading modularity allowing any mix of onboard I/O to be selected at the time of product ordering. The user may select up to four I/O Modules in any mix, which are installed to provide the most efficient use of available I/O points. The various optional onboard modules may then provide useful application specific features.

The MOX Unity has an impressive selection of onboard communication modules available, including support for the latest wireless technologies such as GSM/GPRS. Up to six serial ports and three Ethernet ports can be specified to provide redundant and scalable communications.

For applications that require visual indication, an optional onboard video frame grabber can capture and transmit images to a central location for analysis. The smart design of the MOX Unity includes an optional onboard UPS battery charger ensuring seamless operation in the event of a power supply failure.

The MOX Unity can be configured to provide a unique redundant capability ensuring 100% reliability and uptime. In this configuration, MOX 603 Modular I/O modules provide redundant I/O capability.

The modular nature of the MOX Unity provides a future proof solution. If your requirements should change over time, as industry developments progress or as your plant expands, your MOX Unity system will be ready to accept the new technologies you may require.

For installations that involve explosive atmospheres, the MOX Unity has been certified under the IECEx scheme as non-sparking, with certification level Ex nA II T4.

MODULARITY WITH YOUR CHOICE OF ONBOARD I/O

OPEN AND TRANSPORTABLE IEC 61131-3 CONTROL SOFTWARE

IPSEC AND FIREWALL SECURITY MEASURES

TRUE REDUNDANCY SUPPORTED AT MULTIPLE LEVELS

64MB OF DDR RAM WITH 128MB OF FLASH

INTEGRATED DIAGNOSTICS

STANDARD SERIAL AND TCP/IP COMMUNICATIONS

ONBOARD IMAGE CAPTURE MODULE

GPRS OPTION

SUPPORTS MODBUS, DNP3.0 AND IEC60870-5-101/4

POWERFUL 400HMZ PROCESSOR

EXPANDABLE WITH UP TO THREE ETHERNET, FOUR RS485 PORTS AND TWO RS232 PORTS

NON-SPARKING IN EXPLOSIVE ATMOSPHERES TO EX NA II T4

MOX Unity allows you to select the particular I/O mix and add on options to suit your precise application requirements.

Specifications

MOX Unity I/O Capability	
I/O	Any mix of four I/O modules
MOX 603 I/O via Ethernet	Ethernet Limitations
MOX 603 I/O via Serial	Up to 30 modules
Required Supply Voltage	9VDC to 30VDC without UPS mounted, 18VDC to 30VDC with UPS mounted
Typical Power Consum.(working)	<5W (Base System)
24Vdc Digital Input Module	
Number of Channels	8 Channels
Max Input Voltage	30Vdc
Logic "1"	Vin > 10V
Logic "0"	Vin < 5V
Channel to System Isolation Voltage	5000VDC
Digitial Relay Output Module	
Number of Channels	8 Channel (Relay Output)
Max Output Specifications per Channel	3A 250VAC/ 3A 24VDC
Surge Current for common Connection	Approx. 10A for 10ms
Max Current per Channel	3A
Channel to System Isolation Voltage	1000V rms
4~20mA Analog Input Module	
Number of Channels	8 single ended
Resolution	12 Bits
Accuracy	+/- 0.25%
Conversion Time	25uSec typical
Ranges	4-20mA
Over Voltage Protection	40VDC (max)
Input Impedance	400ohm//100pF
4~20mA Analog Output Module	
Number of Channels	8 single ended
Resolution	12 Bits
Accuracy	+/- 0.25%
Conversion Time	25uSec typical
Ranges	4~20mA
1-5V Analog Input Module	
Number of Channels	8 Single ended
Resolution	12 Bits
Accuracy	+/- 0.25%
Maximum Input Voltage	24VDC

4-20mA Analog Input Module	
Number of Channels	4 x 4 – 20mA Isolated
Resolution	12 Bits
Accuracy	+/- 0.25%
Full Signal Range	0.5-22.0mA
3 x 4 -20mA Channels and 1x 0-30VDC Channel Analog Input Module	
Number of Channels	4 [3 x 4-20mA(isolated), 1 x 0-30VDC (non-isolated)]
Resolution	12 Bits
Accuracy	+/- 50µA
Full Signal Range for mA Channels	0.5-22.0mA
Solid State Digital Output Module	
Number of Channels	8
Recommended Output Voltage Range	24 VDC
Output Current Rating per Channel	1A (max)
Output Current Rating Total	4A (max)
CPU Specifications	
Clock Speed	ARM 400MHZ
DDR RAM	64MBytes
Flash Memory	128MBytes
Communications	
MOX Unity 5021	2x Serial RS232 Ports, 1x Ethernet
MOX Unity 5201	2x Serial RS485 Ports, 1x Ethernet
MOX Unity 5223	2x Serial RS485 Ports, 2x Serial RS232 Ports, 3x Ethernet
MOX Unity 5423	4x Serial RS485 Ports, 2x Serial RS232 Ports, 3x Ethernet
Mechanical Characteristics	
Width	Outside 240mm, Hole Centres 190mm
Height	Outside 168mm, Hole Centres 158mm
Depth	Outside 60mm
Operating Temperature Range	-20 to 70°C(without GSM/GPRS)
Storage Temperature Range	-40 to 85°C
Humidity (non-condensing)	0-90%

IoNix

With built in compatibility to the MOX 601 Open Controller and MOX 602 Field Controller families, and with seamless integration to the MOX 603 Modular I/O range, the MOX IoNix Field Controller completes the entire range of Intelligent Automation products designed and manufactured by MOX Products.

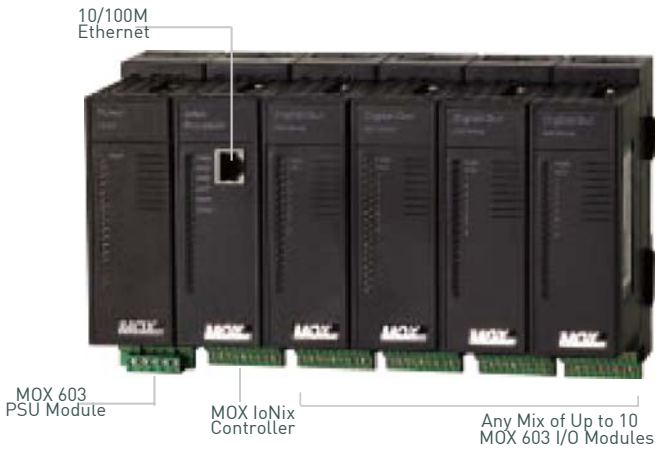
The MOX IoNix Field Controller delivers 400MHz processing power for compact monitoring and control solutions.

Cascade any MOX 603 I/O module directly to the backplane for a compact monitoring and control solution. Onboard communication ports provide connectivity to remote I/O, HMI/SCADA systems, and other interface panels.

Generally, a MOX IoNix Controller will efficiently communicate and control a maximum of 10 interconnected I/O modules.

Sufficient power must be supplied to the rack base MX603-4001 PSU to power all interconnected I/O modules. An external 24VDC power supply rated to 50W (or higher) is recommended.

Typical Usage



POWERFUL 400MHZ PROCESSOR

64MB RAM

128MB FLASH MEMORY FOR PROGRAM AND DATA STORAGE

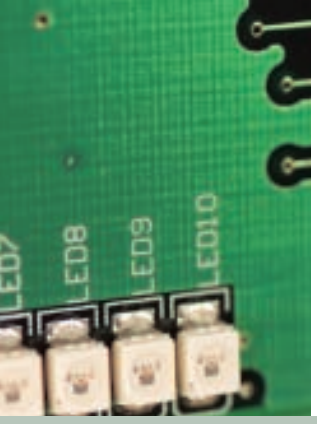
HIGH SPEED 10/100MBPS ETHERNET

BUILT- IN DI, DO CHANNELS

MODULAR DESIGN CASCADES DIRECTLY MOX 603 I/O

INTEGRATED AND TRANSPORTABLE IEC61131 SOFTWARE

CERTIFIED MODEL AVAILABLE AS NON-SPARKING FOR USE IN EXPLOSIVE ATMOSPHERES TO IECEx nA II T4



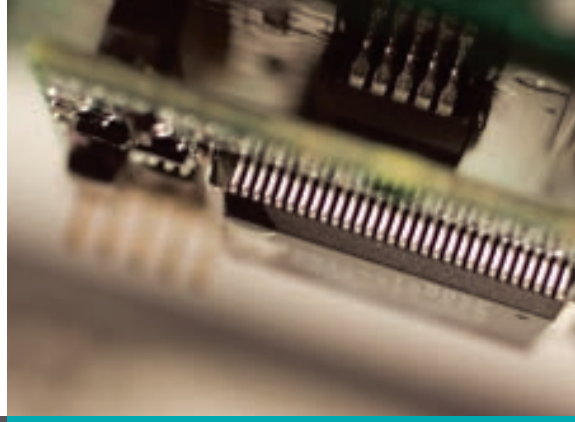
The MOX IoNix packs a powerful 400MHz processor, 64MB RAM and numerous communications options into a compact and modular package.

Specifications

CPU Specifications	
CPU Type	ARM
Speed	400MHZ
RAM	64MB
Flash	128MB
Performance Specifications	
Power Supply (to MX603-4001)	External 24Vdc Supply
Power Dissipation within module	5.5W(max)
Power Bus Capacity	4A Max per Bus
Environmental Specifications	
Operating temperature	-20 to 70°C
Storage temprature	-40 to 85°C
Humidity	5 to 95% non-condensing
Communications	
Serial Communications	2 x RS232 2 x RS485 Up to 115,200bps
Ethernet Communications	1 x 10/100 Mbps Ethernet (MX606-3002-01) 2 x 10/100 Mbps Ethernet (MX606-3002-02) RJ45 Connection
GSM/GPRS Option Module	GSM Modem, GPRS Modem, PPP
I/O	
Built-in I/O	6 x DI Channels, 2 x DO Channels 5000Vrms Isolated to the System DO Output Current Rating 100mA
Rack Base I/O	MOX 603 Rack Base I/O, Cascaded Directly Up to 10 Modules
Mechanical Specifications	
Base (Double)	
Width	80 mm
Heigh	140 mm
Heigh (with terminal strips)	150 mm
Depth	48.5 mm
Module	
Width	40 mm
Heigh	114 mm
Depth	80 mm
Depth (including Base plug)	84 mm

Software Specifications	
Diagnostic Information	
System Information	Firmware Revision, CPU Run Status Cycle Time, Cycle Since Start, Run Time Error Information for I/O and Comms System Alarm Information
Communications Support	
Serial Communications	Modbus RTU Master and Slave Modbus ASCII Master and Slave DNP 3.0 Level 2 Master and Slave IEC60870-5-101 User Defined Serial Protocol
Ethernet Communications	Modbus/TCP Client and Server IEC60870-5-104 DNP 3.0 Level 2 Master and Slave
Programmable Function Blocks	
Gas Flow Calculation Functions	AGA3, AGA7, AGA8
Special Functions	PID, Programmable Modbus Master System Information Retrieval
Communications Functions	Low Level Serial Port Operation; open, send, receive, close
Data File Functions	File Send, File Receive
Variable Sync Functions	Synchronize variables in two controllers
Special Functions	
Communications	Peer to peer Comms and Broadcast Report by Exception Store and Forward Low Level Communications Interface
Data Logging	Data Storing on Lost Communications Time Stamping Interval Based Logging
Local and Remote Functions	IEC61131 Programmable System Firmware Upgrade
Isolation	
Ethernet Port to System	1500Vrms
Serial Ports to System	RS485: 2500Vrms RS232: None
DO Channels to System	5000Vrms
DI Channels to System	5000Vrms

GSM / GPRS



WIRELESS COMMUNICATIONS

DUAL BAND GSM/GPRS MODEM

MX606-3201 GPRS Module

IoNix Wireless Applications

The MX606-3201 module works with the IoNix Controller for wireless communication applications based on the GSM 900MHz and GSM 1800MHz frequencies. The GPRS module is designed to transmit data and short messages over GSM/GPRS networks, allowing the IoNix to communicate with remote terminals. The MX606-3301 base provides a dedicated power and RS-232 connector which facilitates connection to the MOX IoNix.

MX606-3202 GPRS Module

Standalone GPRS Module

The MX606-3202 is an independent GPRS modem used for industrial telemetry applications and is based on the GSM 900MHz and GSM 1800MHz frequencies. It is designed to transmit data and short messages over GSM/GPRS networks, allowing communication with remote terminals. The MX606-3202 GPRS modem is powered by an external 24VDC. It has a standard DB9 connector which can be connected to the host device.

Figure 1: MX606-3201 GPRS Module

Figure 1: MX606-3202 GPRS Module

The GPRS module is designed to transmit data and short messages over the GSM/GPRS network.

Specifications

Feature	
Dual Band	GSM 900MHz, GSM 1800MHz
	Compliant to GSM Phase 2/2+
GSM Class	Small MS
GPRS Connectivity	GPRS multi-slot class 10
	GPRS mobile station class B
GPRS Data Services	Downlink: up to 85.6 kbps
	Uplink: up to 42.8 kbps
CSD Data Services	CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbps, non-transparent, V.110
	Unstructured Supplementary Services Data (USSD) support
Coding Schemes	CS1, CS2, CS3, CS4,
SMS	MT, MO, CB, Text and PDU mode
	SMS storage: SIM card plus 25 SMS locations in the mobile equipment
	Transmission of SMS alternatively over CSD or GPRS. Preferred mode can be user-defined.
Fax Service	Group 3: Class 1, Class 2
User Interface	AT-commands
SIM Interface	Supported SIM card: 3V
Antenna Interface	50Ω antenna connector

Power	
Interface	10 pin socket
MX606-3201 Input Voltage	5V
MX606-3202 Input Voltage	Wide range, 9V to 36V
Power Dissipation	8W maximum

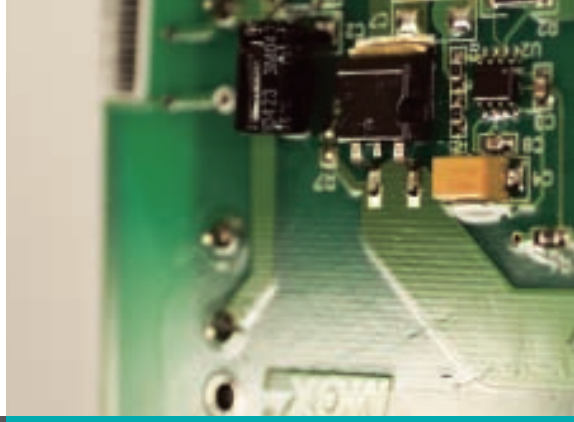
Reset Function	
AT Command Reset	Supported
Manual Reset	Supported

RS232 Port Characteristic	
Connector	Female DB9
Logic Level	EIA/TIA-232E
Speed	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps, Auto-baud
Data Bits	8
Stop Bits	1
Parity	None
Cable Length	0 to 15m

Physical	
Dimension (L * W * H) (mm)	114 * 40 * 93
Installation	DIN Rail

Environmental	
Operating Temperature	-20 to 50 °C
Storage Temperature	-40 to 85 °C
Humidity	5 to 90% non-condensing

MoxNET



MOX COMMUNICATIONS DEVICE
MX606-3401 and MX606-3403

The MoxNET Switch is an Ethernet Switch with 8 RJ45 ports and an optional single mode fibre port. (The MX606-3403 MoxNET Switch doesn't have the fibre port option.) All RJ45 ports support 10/100Mbps rate and full/half duplex auto-negotiation. The fibre port is a duplex 100BASE-LX10 port. The switch has 128k bytes of SRAM used to buffer the Ethernet frame data from all ports. It operates in store and forward mode.

8 ETHERNET PORTS

OPTIONAL FIBRE PORT

STORE AND FORWARD OPERATION

128K OF SRAM

STATUS LEDS

The MoxNET Switch is an Ethernet Switch with 8 RJ45 ports and an optional single mode fibre port.

Specifications

Ethernet Interface	
Ports	8 x RJ45 Ports
	1 x Fibre Ports (optional)

RJ45 Port Characteristics	
Speed	10/100M auto-negotiation
Duplex Mode	Full/Half Duplex auto-negotiation
Auto-MDIX	Support
Broadcast Storm Protection	5% broadcast frames allowed
Flow Control	802.3x, Back Pressure
TP Cable Length	100m max

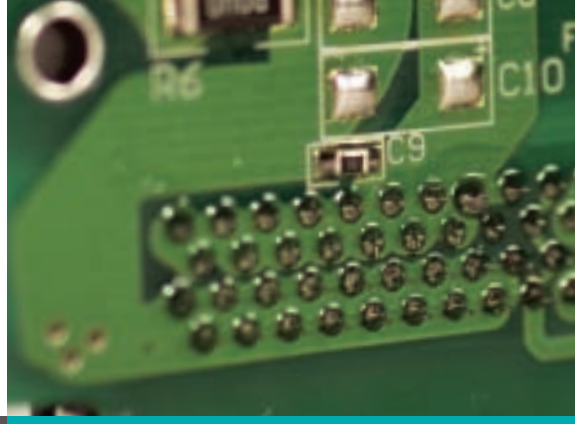
(Optional) Fibre Port Characteristics	
Fibre Mode	Single Mode
Wavelength	1300nm
Speed	100Mbit/s
Duplex Mode	Full Duplex
Broadcast Storm Protection	5% broadcast frames Allowed
Flow Control	802.3x
Connector Type	SC
Fibre Cable Length	0 to 20000m @ 0.5DB/km

Power Characteristics	
Interface	3 Pin Socket
Input Voltage	Wide range, 9~36V
Power Dissipation	6W
Power Dissipation with Optional Fibre Port	8W

Mechanical Characteristics	
Material	Aluminum
Dimension (L x W x H)	114mm x 40mm x 93mm
Installation	DIN-Rail, Wall Mounting (Optional)

Environmental Conditions	
Operating temperature	-20°C to 70°C
Storage temperature	-40°C to 85°C
Humidity	5 to 90% non-condensing

Gateway



These days, most new plants prescribe fieldbus systems as an overall communication solution. For this purpose, only control components with a corresponding connection are utilised. Having protocol conversions available and integrated within the control system is a highly flexible and yet a simple and quickly realisable solution.

The MOX Gateway controller provides protocol conversion between industry standards such as Modbus, Modbus/TCP and leading fieldbus systems. The modular fieldbus additions are high performance options meeting the highest industry demands.

Comprehensive functions are available for start-up and ongoing diagnostics with certain device conditions and transmission errors displayed on front panel LEDs. Further diagnostic functions, especially for testing the fieldbus communications may also be carried out directly from the configuration software.

Specifications

Communications	
Serial Protocols (master/slave)	ModbusASCII/RTU (enquire about other protocols)
Other Serial Ports	RS232 or RS485
Max. Baud Rate	115200 baud
RS485 Isolation	Up to 2500Vrms
Ethernet Port	2x RJ45
Ethernet Port Data Rate	10/100Mbps
Message Format	TCP/IP
Isolation (RS485 port)	2500V
Telephone Modem Support	Transparent over any modem
Multi-drop Radio Links	Half & full duplex supported

2 X 10/100 MBPS ETHERNET PORTS

RS232/485 SERIAL PORTS

SUPPORTS STORE AND FORWARD DATA ROUTING

PROFIBUS DP MASTER

***INTERBUS MASTER**

CONTROLNET

***DEVICENET**

***CANOPEN**

***AS-INTERFACE**

ETHERNET/IP (INDUSTRIAL PROTOCOL)

GSM/GPRS CAPABLE

*Available when required by customer.

MOX Gateway fieldbus modules provide protocol conversion and data transfer between leading industry standard protocols.

PROFIBUS DP Master Interface	
PROFIBUS Interface	RS485 Optically Isolated DSub-Female 9pin
Max Number of Slaves	125
Bytes per Slave	244
Transmission Rate	9.6kBaud - 12MBaud

Interbus Master	
Interbus Interface	RS422 Optically Isolated DSub-Male 9pin
Diagnostic Interface	RS232 Non Isolated DSub-Male 9pin
Diagnostic Interface	RS232C Non Isolated
Max Input Data	512 Byte
Max Output Data	512 Byte
Transmission Rate	500kBaud

DeviceNet	
Interface	ISO 11898 Optically Isolated CombiCon 5 pin
Diagnostic Interface	RS232C Non Isolated DSub-Male 9pin
Messaging	Explicit Peer to Peer
Transmission Rate	500kBaud

ControlNet	
Interbus Interface	Redundant Bus Interface 2x BNC
Network Access Port Interface	RS422 Non Isolated RJ45
Max Input Data	480 Byte
Max Output Data	480 Byte
Transmission Rate	5 Mbaud

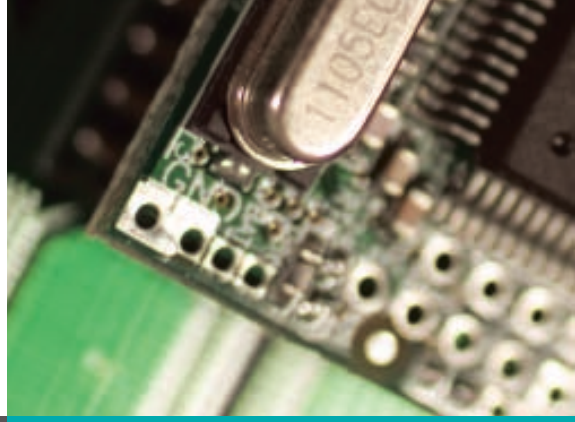
CANOpen	
Interface	ISO 11898 Optically Isolated DSub-Male 9pin
Diagnostic Interface	RS232C Non Isolated DSub-Male 9pin
Max Number of Nodes	127
Messaging	Explicit Peer to Peer
Transmission Rate	10kBaud - 1MBaud

AS-Interface	
AS-Interface	Optically Isolated 2x CombiCon 2pin
Diagnostic Interface	RS232 Non Isolated DSub-Male 9pin
Number of Channels	2
Max Number of Slaves	62
Max Input Data	248 bit per channel
Max Output Data	186 bit per channel
Transmission Rate	167kBaud

EtherNet / IP (Industrial Protocol)	
Protocol Conversion	Between Ethernet/ IP and MODBUS TCP/IP, DNP, IEC, etc.
Ports	1 x 10/100 Mbps Ethernet/ IP, 2 x Isolated RS485 serial, 2 x 10/100 Mbps Ethernet and 1 x RS232 serial

MOX Gateway I/O Capability	
MOX 603 I/O via Ethernet	Ethernet Limitations
MOX 603 I/O via Serial	Up to 32 modules
Required Supply Voltage	18-30VDC or 9-30VDC
Typical Power Consum.(work)	< 5W (Base System)

MoxGRAF

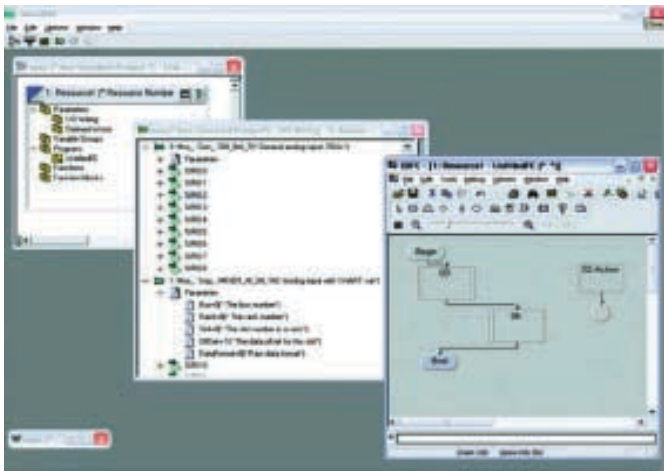


MoxGRAF is a flexible development environment for designing powerful applications simply and without knowledge of complex, high-level computer languages. The user friendly structured programming methodology and intuitive graphical and textual editors for six automation languages, results in robust applications developed with simplicity and in the shortest possible timeframe.

With MoxGRAF, application debugging does not require the developer to return to the basic process control logic, nor to remember the exact syntax of all languages. At all stages of the development, checks are performed on the program and language specific syntax. Errors are detected and corrected, or the user is prompted with the correct use of each language. The extensive hypertext based on-line help system includes a thorough cross-reference explanation of the IEC 61131-3 standard.

MoxGRAF also features a powerful self-documenting capability. The document generator builds a complete, coherently grouped printed document of all project items and provides a history of their modification.

Both graphical and textual programs may be included in the final documentation, as can the overall project architecture, I/O wiring lists, dictionaries, cross-references and more.



DELIVERS OPEN AUTOMATION SOLUTIONS

IEC 61131-3 COMPATIBLE APPLICATIONS DEVELOPMENT

COMPREHENSIVE ON-LINE HELP SYSTEM

FIVE IEC LANGUAGES PLUS FLOW CHART

DECREASED DEVELOPMENT TIME

POWERFUL AND ROBUST DEVELOPMENT TOOLSET

USER DEFINABLE FUNCTION BLOCKS AND LIBRARIES

Accelerate the development of your solution and benefit from the highly portable and intuitive IEC 61131-3 programming environment.

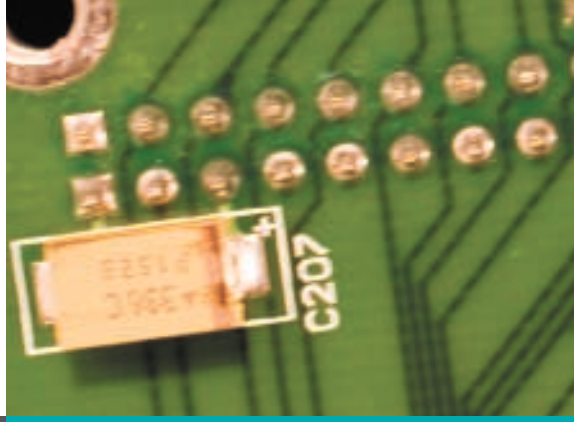
Standard Operators

The following are standard operators of the IEC languages.

Data Manipulation	
1 Gain	Assignment
Neg	Analog Negation
Boolean Operation	
& (AND)	Boolean AND
>=1 (OR)	Boolean OR
=1 (XOR)	Boolean Exclusive OR
NOT	Boolean NOT
Arithmetic Operation	
+	Addition
–	Subtraction
*****	Multiplication
/	Division

Logic Operators	
AND_MASK	Analog bit to bit AND mask
OR_MASK	Analog bit to bit OR mask
XOR_MASK	Analog bit to bit Exclusive OR mask
NOT_MASK	Bit to bit negation
Boolean Operation	
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
=	Is equal to
<>	Is not equal to

Functions



Standard Functions

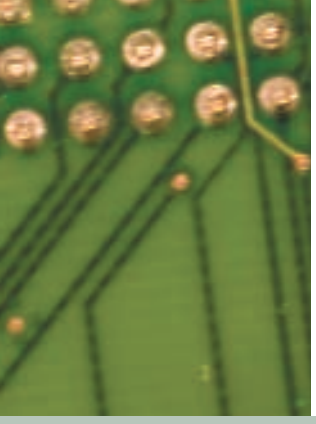
These are standard functions supported by MoxGRAF. Such functions are pre-defined and do not have to be declared in the library.

Math	
ABS	Absolute value
EXPT	Exponent
LOG	Logarithm
POW	Power calculation
SQRT	Square root
TRUNC	Truncate Decimal part
MoxPID	Mox PID
MoxPIDII	PID control II
Trigonometric	
ACOS	Arc Cosine
ASIN	Arc Sine
ATAN	Arc Tangent
COS	Cosine
SIN	Sine
TAN	Tangent
Register Control	
ROL	Rotate Left
ROR	Rotate Right
SHL	Shift Left
SHR	Shift Right
String Management	
DELETE	Delete sub-string
INSERT	Insert string
FIND	Find sub-string
MLEN	Get string length
LEFT	Extract left
MID	Extract middle
REPLACE	Replace sub-string
RIGHT	Extract right
DAY_TIME	Time of day

Data Manipulation	
MIN	Minimum
MAX	Maximum
LIMIT	Limit
MOD	Modulo
MUX4	Multiplexer (4 Input)
MUX8	Multiplexer (8 Input)
ODD	Odd parity
RAND	Random value
SEL	Binary selector
Any_to_BOOL	Convert any variable to Boolean
Any_to_DINT	Convert any variable to double integer
Any_to_REAL	Convert any variable to real
Any_to_SINT	Convert any variable to small integer
Any_to_ STRING	Convert any variable to string
Any_to_TIME	Convert any variable to time
Strtoreal	Convert string to real
Realtostr	Covert real to string
Data Conversion	
ASCII	Character ASCII code
CHAR	ASCII code character
File Management	
F_CONTROL	
F_RW	
MOXLog	Log data

Note: When new "C" function blocks are created, they can be called from the FBD language. Some functions shown are only available with the MOX Unity.

Booleans	
SR	Set dominate bistable
RS	Reset dominate bistable
R_TRIG	Rising edge trigger
F_TRIG	Falling edge trigger
SEMA	Semaphore



Develop reliable solutions faster using powerful inbuilt functions for PID control, AGA gas flow calculations and advanced process control.

Counting	
CTU	Up counter
CTD	Down counter
CTUD	Up-down counter
Timers	
TON	On-delay timer
TOF	Off-delay timer
TP	Pulse Timer
Integer Analogs	
CMP	Full comparision
STACKINT	Stack of integer analogs
Real Analogs	
AVERAGE	Running average
HYSTER	Boolean hysteresis
LIM_ALRM	High/low limit alarm
INTEGRAL	Integration over time
DERIVATE	Differentiation
Signal Generation	
BLINK	Blinking boolean signal
SIG_GEN	Signal generator
System	
Temperature	Dectect the CPU board temperature
MoxGetTime	Read system time
MoxSetTime	Set system time
MXPower	Detect the MOX Unity power supplier
SysInfo	System Information
Watchdog	Watchdog

Communication	
Ping	Ping IP address
Socket	TCP/IP Operation
URCV_S	Communication function - Receive string
USEND_S	Communication function - Send string
Eth2Com	Ethernet to serial port process
Email Tx	Email send
EmailRx	Email receive
Connect	Communication function - Connect
ComX	Comm port process
GPRS	GPRS
ModbusM	ModBus Master
ModnetM	Modnet Master
MoxRxTx	Read or write remote data
Modem	Modem process
PPP	PPP connection management
Gas Calculation	
FlowAdjust	Flow adjust of nature gas
AGA3	AGA3 orifice metering of natural gas
AGA7	AGA7 Gas Measurement
AGA8D	AGA8 Detail Characterization Method
AGA8G	AGA8 Gross Characterization Method
Special	
Ammeter645	Ammeter645 Data Access
UPSConf	UPS Configuration
UPSMonitor	UPS Mornitoring
AmmeterWS	Ammeter Data Access for WeiSheng
F_Control	Open,close and delete the file
F_RW	Read from or write to the file
FileTrans	File Transfer
FrameGrab	Frame Grabber

Ordering

MOX Unity Field Controllers	Main Feature	Part Number
MOX Unity 5021	2x Serial RS232 Ports, 1x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU	**MX602-5021- . . . - . . . .**
MOX Unity 5201	2x Serial RS485 Ports, 1x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU	**MX602-5201- . . . - . . . .**
MOX Unity 5223	2x Serial RS485, 2x Serial RS232 Ports, 3x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU	**MX602-5223- . . . - . . . .**
MOX Unity 5423	4x Serial RS485, 2x Serial RS232 Ports, 3x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU	**MX602-5423- . . . - . . . .**
MOX Unity, Feature Options	**Main Feature**	**Part Number**
GSM/GPRS Module	For Wireless Multipoint Communications (Dual-band EGSM900 and GSM1800)	**add -100**
Video Capture Module	Streaming video capture	**add -010**
UPS Module	Power Management Module including UPS Battey Charger	**add -001**
	Feature Option not Selected	**add -000**
MOX Unity, IO Options*	**Main Feature**	**Part Number**
Select four modules of any combination. The part number specifies the selected modules and installation position.		
24Vdc Digital Input Module, 8 Channel	8 x 24Vdc Digital Inputs	**add - 1**
Digital Relay Output Module, 8 Channel	8 x 20-265Vac / 24Vdc Digital Outputs	**add - 2**
4-20mA Analog Input Module, 8 Channel	8 x 4-20mA Analog Inputs	**add - 3**
4-20mA Analog Output Module, 8 Channel	8 x 4-20mA Analog Outputs	**add - 4**
1-5V Analog Input Module, 8 Channel	8 x 1-5V Analog Inputs	**add - 6**
Isolated Analog Input Module, 4 Channel	4 x 4-20mA Isolated Analog Inputs	**add - 7**
Isolated Analog Input Module, 4 Channel	3 x 4-20mA Isolated and 1 x 0-30Vdc Non-isolated Analog Inputs	**add - 8**
24VDC Digital Output Module, 8 Channel	8 x 24Vdc Digital Outputs	**add - 9**
	Part Number for Selected IO Options (4 Digits) IO Option Not Selected	**add - x x x x** **add - 0 0 0 0**

Mox Software Configturator	Main Feature	Part Number
MoxGRAF V4.x (128pt Licence)	Parallel Port Dongle, Limit of 128 I/O	**MX602-0011-003**
MoxGRAF V4.x (Unlimited Licence)	Parallel Port Dongle, Unlimited I/O	**MX602-0011-004**
MoxGRAF V4.x (128pt Licence)	USB Port Dongle, Limit of 128 I/O	**MX602-0011-005**
MoxGRAF V4.x (Unlimited Licence)	USB Port Dongle, Unlimited I/O	**MX602-0011-006**
MOX Gateway	**Main Feature**	**Part Number**
Gateway - PROFIBUS DP Master	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, PROFIBUS DP Master	**MX602-3212-01**
Gateway - PROFIBUS DP Slave	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, PROFIBUS DP Slave	**MX602-3212-02**
Gateway - ControlNET	2 x RS485, 2 x Ethernet, 500MHz x 86 CPU, ControlNET	**MX602-3212-03**
Gateway - PROFINET Master	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, PROFINET Master	**MX602-3212-04**
Gateway - PROFINET Slave	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, PROFINET Slave	**MX602-3212-05**
Gateway - EtherNet/IP Master	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, EtherNet/IP Master	**MX602-3212-06**
Gateway - EtherNet/IP Slave	2 x Isolated RS485, 1 x RS232 Ports, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, EtherNet/IP Slave	**MX602-3212-07**
MOX 606 IoNix	**Main Feature**	**Part Number**
MOX 606 IoNix CPU-02 (1 Ethernet)	2 x RS485, 2 x RS232, 1 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, 6ch onboard DI, 2ch onboard DO	**MX606-3002-01**
MOX 606 IoNix CPU-02 (2 Ethernet)	2 x RS485, 2 x RS232, 2 x Ethernet, 64MB DDR RAM, 128MB Flash RAM, ARM 400MHz CPU, 6ch onboard DI, 2ch onboard DO	**MX606-3002-02**
MOX 603 PSU Module 24VDC	Power Supply Required for IoNix	**MX603-4001**

Ordering

IoNix Hazardous Environment Modules	Main Feature	Part Number
MOX606 IONITY CPU-02 (1 Ethernet)	2xRS232, 2xRS485, 1x10/100 Mbps Ethernet, 6xDI, 2xDO, Certified to IEC nA II T4 Gc	**MX606-5002-01**
MOX606 IONITY CPU-02 (2 Ethernet)	2xRS232, 2xRS485, 2x10/100 Mbps Ethernet, 6xDI, 2xDO, Certified to IEC nA II T4 Gc	**MX606-5002-02**
IoNix Communications Options	**Main Feature**	**Part Number**
MOXNET Switch (8 x RJ45)	8 x RJ45 auto 10/100Mbps ports half and full duplex	**MX606-3403**
MOXNET Switch (8 x RJ45, 1 x Fiber)	8 x RJ45 auto 10/100Mbps ports half and full duplex, 1 x single mode fiber port (1300nm) duplex 100BASE-LX10	**MX606-3401**
MOX 606 GSM/GPRS Module	For Wireless Multipoint Communications	**MX606-3201**
IoNix Base Units	**Main Feature**	**Part Number**
CPU Base - CPU-02 (1 Ethernet)	Dual Base for MX606-3002-01 CPU-02 Module and MX603-4001 PSU Module	**MX606-3102**
CPU Base - CPU-02 (2 Ethernet)	Dual Base for MX606-3002-02 CPU-02 Module and MX603-4001 PSU Module	**MX606-3103**
CPU Base (For MX606-5002-01)	Dual Base to suit Single Ethernet IONITY CPU-02 & MX603-9001 PSU, Certified to IEC Ex nA II T4 Gc	**MX606-5102**
CPU Base (For MX606-5002-02)	Dual Base to suit Dual Ethernet IONITY CPU-02 & MX603-9001 PSU, Certified to IEC Ex nA II T4 Gc	**MX606-5103**

* The default hierarchy for IO Module Installation is DI, DO, AI, AO
** Superseded equipment may be purchased upon request (subject to availability)
*** For other fieldbus interface modules, please contact MOX Products or your distributor.

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