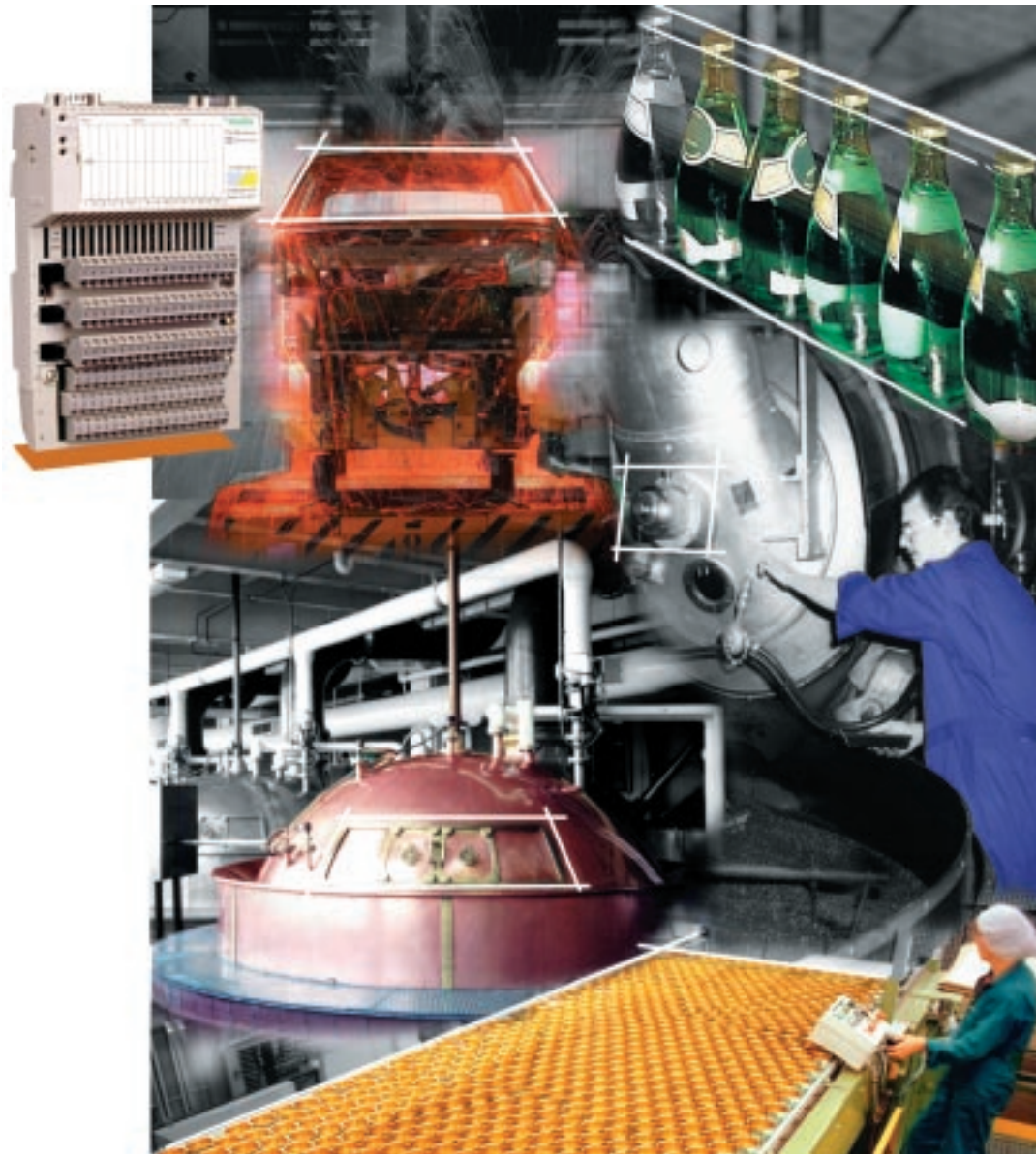
Control system platform

Modicon TSX Momentum

Open architecture system



MODICON

Telemecanique

GROUPE SCHNEIDER

■ Merlin Gerin ■ Modicon ■ Square D ■ Telemecanique

Modicon TSX Momentum

Open for business

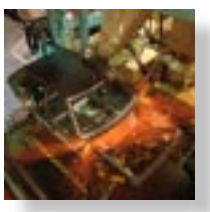
In the constantly changing world of technology, how do you protect against rapid obsolescence? By adapting to changes as quickly and efficiently as possible.

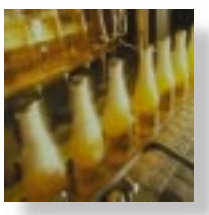
As a user of industrial control, how do you plan your automation systems wisely for today as well as for the future? By investing in the most adaptable and versatile control system available. If you are an OEM, how do you standardize your machine and process designs when your customers utilize various control networks and require compatibility with different control vendors? By selecting a system that is adaptable to the many different control and network products available in the industry.

How do you achieve all this? Namely, by choosing Modicon TSX Momentum from Schneider. The control system that was designed to change and adapt as the technology around it does too.

What is TSX Momentum?

TSX Momentum is a complete family of control products – I/O modules, Processors, Communication Adapters, and Option Adapters - whose unique modular design gives you the flexibility to create a system that meets your needs perfectly today, and whose adaptability protects against obsolescence in the future.

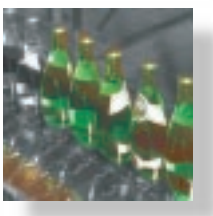




- Distributed I/O
- Independent processing
- Distributed systems
- Integrated architectures

Modicon TSX Momentum

Adaptable systems for varying needs

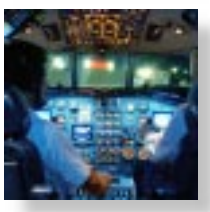


Cost effective for distributed I/O

For applications requiring small “drops” or concentrations of I/O distributed over many locations, the TSX Momentum I/O system (Communication Adapters and I/O Bases) cost effectively locate I/O close to the process on many popular open fieldbus networks. For example, you could have requirements to deploy distributed I/O in a PC based control environment. Whether the supported I/O network of the PC based control system is Modbus Plus, FIPIO, Ethernet, Interbus, Profibus, DeviceNet, or ControlNet, TSX Momentum can stabilize your designs.

Independent processing

Rather than put a Communication Adapter on the I/O Base, you could put a Processor Adapter on instead. Now you’ll have a simple, small controller. With the wide variety of I/O Bases to choose from on which a Processor Adapter can be mounted, many applications on the low end can be reached simply and cost-effectively. If standalone control of 16 to 32 points is required, there are DC and AC discrete combination input-output bases to deploy. In cases were speed is required, there is a Fast Response I/O Base that could be used in conjunction with the FastScan M1 Processor Adapter. And, if analog is required there is a multi-function I/O Base that supports four analog inputs, two analog outputs and six 24 Vdc discretes — four inputs and two outputs. In addition to the standard Modbus programming port, some Processor Adapters have a second port to support TSX Momentum distributed I/O. Using the Interbus Communication Adapters, you can distribute over 80 TSX Momentum I/O modules up to 8 miles from one CPU and I/O Base.



Distributed system

In larger, integrated control architectures, TSX Momentum can off-load, simplify, bridge, distribute, consolidate, and otherwise fill the gaps in conventional systems. Being part of the 984 Family of products, TSX Momentum is a natural extension to the Modicon TSX Quantum and TSX Compact architectures.

Integrated architectures

First, as a distributed I/O platform, TSX Momentum I/O is made-to-order for the Profibus DP and I/OBus (Interbus-140 NAO 611 10) communication modules in the TSX Quantum series, and the I/OBus (Interbus-AS BBKF 211) communication module in the TSX Compact series—not to mention Modbus Plus Communication Adapters for the Quantum and Compact. Further, FIP I/O Communication Adapters provide distributed I/O for Modicon TSX Premium and TSX 7 controllers. Then, there are the Processor and Option Adapters, each with their own locally distributed I/O, networked together via Modbus Plus and programmatically interlocked into larger Quantum and/or Compact applications! So, whatever your process application needs may be, Modicon is the solution. High speed, low-cost, modular, open architectures.

I/O Base

Communication Adapter

Processor Adapter

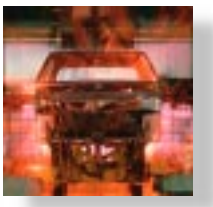
Option Adapter

Modularity for incredible flexibility

The TSX Momentum System is comprised of four kinds of products which snap together to form varying automation control elements. These PLC, communication, and I/O elements can then be networked together to create an overall control scheme. However applied, TSX Modicon Momentum delivers power, intelligence and control right where you need it—at the point of control.

Modicon TSX Momentum

System architecture



TSX Momentum I/O Bases

TSX Momentum I/O Bases support the rest of the control system – Processors, Option Adapters, and Communication Adapters – which attach to the I/O base. Many types of I/O modules are available, including analog I/O, discrete I/O, multi-function analog, and bi-directional discrete bases. In addition, TSX Momentum's simple, plug-in wiring means installation and maintenance is a snap. You can use either standard 35mm DIN rail to mount the I/O Base, or mount it directly to a panel. Mounted on the I/O Bases are either Communication Adapters or Processor Adapters to control the I/O Base.

TSX Momentum Communications Adapters

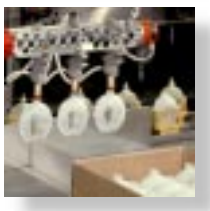
When a Momentum I/O Base is coupled with a Communications Adapter, the two form a remote I/O drop that directly connects to virtually any standard fieldbus I/O network. Together, TSX Momentum I/O supports control systems based on personal computers, programmable controllers, and TSX Momentum processors.

TSX Momentum Processor Adapters

When local distributed intelligence is required at the point of control, TSX Momentum has the answer. TSX Momentum M1 Processor Adapters are full-fledged PLCs containing a CPU, RAM and Flash Memory. They are based on the popular Modicon Family, just like the Modicon TSX Compact and Quantum PLCs, and they snap onto the TSX Momentum I/O Base just like the Communications Adapters.

TSX Momentum Option Adapters

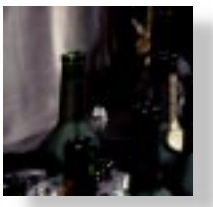
The Option Adapters provide the Processor Adapters with additional networking capability, time-of-day clock and battery backup. The Option Adapter connects directly to the I/O Base, and on top of it connects a Processor Adapter.



- Modular
- Adaptable
- Versatile
- Flexible

Modicon TSX Momentum

Benefits



Adaptable

From now on, you don't have to make a long-term commitment to any particular control network or technology because TSX Momentum components are designed around open architectures. They are designed to meet your needs for today, and to be adaptable to your needs for tomorrow.

But it doesn't stop at just being compatible with all the most commonly used communication networks around, such as Modbus, Modbus Plus, Interbus, Profibus DP, Ethernet and FIPIO. Momentum is more – it is a versatile combination of powerful control system components.

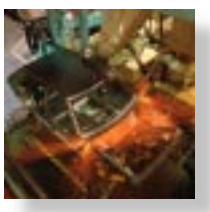
Versatile

TSX Momentum is really many control products all rolled up into one. It is a traditional PLC based system, it is a distributed I/O system for DCS or PC-based control architectures, and it can serve as an intelligent subsystem for 984 control architectures. Above all, TSX Momentum is the right solution.

Flexible

Modicon TSX Momentum, when used together as a system or in a system with other Modicon automation products, provides control over the vast array of your most challenging automation requirements. TSX Momentum has been engineered to be a highly flexible, integrally networked, distributed system.

The variety of TSX Momentum I/O module bases ensures optimal flexibility when tailoring the control to your machine or process. TSX Momentum includes discrete and analog I/O, as well as specialty I/O such as high speed counters. Need intelligent I/O such as a high speed logic solver where system response time is critical for productivity? In these applications, TSX Momentum can read an input, make a decision, and drive an output in less time than it takes many PLCs to scan its program. TSX Momentum, modularity expressed as flexibility.



Modicon TSX Momentum

Low-life cycle costs

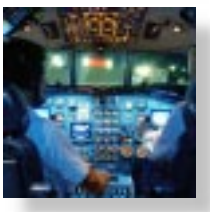
TSX Momentum has been designed with every aspect of the cost of ownership in mind. From design to installation to support, TSX Momentum saves you time and money. TSX Momentum I/O is inexpensive to apply and maintain. From machine or process design, to commissioning, maintenance and repair, TSX Momentum is superior in every way.

Traditional I/O requires wiring from the field devices to terminals in central panels, and from the terminal blocks to I/O modules in large racks. TSX Momentum eliminates the terminal blocks and long device-wire runs by bringing the I/O module nearer the sensors and actuators, which then wire directly to the I/O Base. This reduces wiring by up to 50% and saves up to 30% in panel space required for the terminal blocks and associated wiring. Simple wiring to field devices also means less engineering, less installation labor, and a system that is up and running faster. With its small profile, TSX Momentum fits easily into small cabinets such as junction boxes or operator panels.

Simple, standard field bus connections speed installation and further reduce commissioning cost. On-going maintenance is also made simple by module diagnostics and intuitive LED displays. At a glance, the LEDs tell you that the supply voltage is present, the module is ready, network communications are active, and I/O point status. DC output modules also have an output fault LED for each point.

Replacing modules is also a breeze. The terminal connectors snap in and out, and the Communication Adapter snaps on and off, allowing for the quick change of I/O Bases.

OEMs will love TSX Momentum. No matter what controller or network a customer wants, you can use this common I/O platform, and common I/O means less engineering, reducing overall machine and project cost.



Modicon TSX Momentum

I/O module bases

I/O for open architectures

To design control systems, engineers must consider the cost of the controls, installation costs, and project timing. To complicate the job, systems must fit into communication networks and system architectures dictated by company standards, past control system experience, the control vendor, or the type of application.

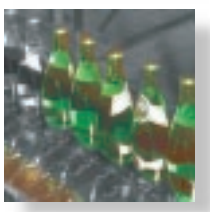
Designing control systems to fit cost considerations and application requirements can be like trying to fit a round peg in a square hole—until Schneider created TSX Momentum I/O for open architecture control systems. TSX Momentum is a full family of industrial quality, high performance input and output modules which meet the internationally-accepted IEC electrical standards to ensure their reliability in the harshest industrial environments.

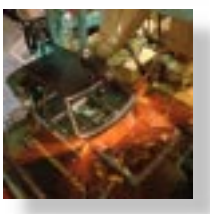
And it saves money and time by simplifying the most complicated and labor intensive part of installing the control system – the I/O and its wiring - and it easily fits into virtually any system architecture.

Flexible I/O fits virtually any application

TSX Momentum is flexible and adaptable. Whether it be in discrete parts manufacturing or in process control, no matter where in the world your plant is located, Momentum is adaptable to all your concerns. TSX Momentum's compact design puts high functionality right where you need it, at the device controlled. Direct 2, 3, or 4 wire connections eliminate the need for intermediate terminal blocks, simplifying wiring. All this means control at a low installed cost.

With TSX Momentum, you are no longer limited to one vendor's products on the vendor's proprietary network.





- Flash-based executive memory
- Flash-backed application memory
- Communications

Modicon TSX Momentum

Processor adapters

TSX Momentum Processor Adapters are intelligent modules containing EXEC memory, application memory and communications ports. With all memory onboard, no extra chips or cartridges are necessary for configuration. LED status indicators aid in troubleshooting by showing the health and status of the CPU, while other LEDs indicate activity on the communication ports. Processor Adapters come in two memory sizes (64K and 256K RAM), support all the basic popular 984 instructions, and are programmable with Modsoft or Concept software.

Flash-based executive memory

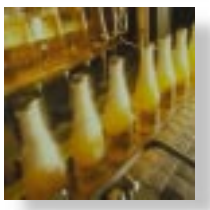
Processor Adapters use Flash memory technology to support the controller's Executive memory and instruction set. This state-of-the-art, non-volatile memory technology enables you to perform field upgrades of the Executive by downloading a file rather than changing physical parts. This greatly simplifies upgrading hardware to the latest software technologies.

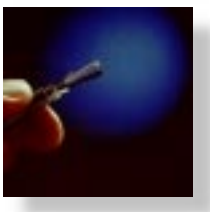
Flash-backed application memory

Processor Adapters also allow applications to be backed up to flash memory, eliminating the need to have the original application program locally and readily available. If for any reason the application memory is lost, the user can have the application restored in seconds. No need to hunt down the correct application file if it is held in nonvolatile memory in the controller!

Communications

TSX Momentum Processor Adapters are also flush with communication options, especially when coupled with an Option Adapter. They come equipped with the industry de facto standard Modbus port and there is a provision on many models for a second port. It can optionally be a second Modbus port, or it can be an I/OBus port, which can support over 80 TSX Momentum I/O modules. In addition, Option Adapters can be added to give the Processor Adapter incredible networking capabilities on Modbus Plus or other serial devices such as modems, operator interface terminals and marquee displays.





Modbus Plus

Interbus

I/O Bus

Profibus DP

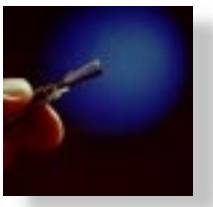
FIPIO

Ethernet I/O

TSX Momentum supports networks designed for a variety of information needs, whether you are sharing files or controlling set-points. TSX Momentum Communication Adapters provide simple, direct connection to most networks used for distributed and open control systems. Momentum network communication adapters plug directly on to the Momentum I/O Bases, providing plug-in connectivity.

Modicon TSX Momentum

Communication adapters



Modbus Plus

Modbus Plus is a peer-to-peer network that communicates with up to 64 devices, such as TSX Momentum I/O modules, programmable controllers, computers, Human-Machine-Interfaces (HMI), and other Modbus Plus compatible control devices. Modbus Plus has the capability to communicate I/O data, interlocks, data acquisition, program uploads/downloads, and online programming and monitoring.

Interbus

The Interbus Communication Network is an open architecture network that utilizes a master - slave mode of operation for high speed I/O data communications. Interbus utilizes either a single programmable controller or industrial computer as the network master to communicate with up to 256 slave devices, such as TSX Momentum I/O modules or other Interbus compatible control devices.

I/O Bus

I/O Bus is supported by TSX Momentum with a direct interface as part of the Processor and Communication Adapters, and is compatible with all Interbus devices that do not require the use of the PCP protocol of Interbus. I/O Bus is a high speed field bus capable of reliable, deterministic control of I/O over distances of up to 42,000 feet. The Interbus Communication Adapter for Momentum I/O modules is designed for use with Momentum Processor Adapters or any other control system with an Interbus master device.

Profibus DP

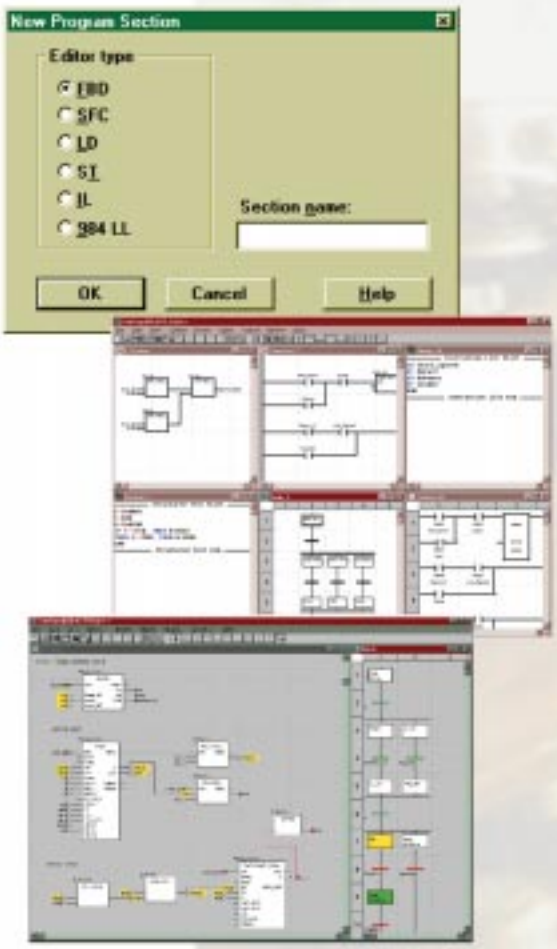
Profibus DP is an open, industry standard communication network that enables Momentum I/O to be used in open architecture control systems with other Profibus DP compatible control products. It provides a flexible, time critical, cost-effective solution for distributing I/O modules throughout a large area.

FIPIO

FIPIO is an industrial communication network that enables TSX Momentum I/O to be used with Telemecanique TSX Premium, TSX Series 7 and April programmable controller systems as well as other FIPIO compatible control products.

Ethernet I/O

The use of Modbus, TCP/IP, and Ethernet allows connection to Schneider Automation control products, including TSX Momentum I/O Modules, and provides access to operations data from field devices on the manufacturing floor on up through to the Plant Wide Enterprise. Ethernet utilizes an IP addressing scheme which permits a nearly unlimited number of units or connections on the network. And with the use of standard Ethernet routers, hubs, and bridges, the performance and distance capabilities of the network can be tailored to meet the needs of almost any control system.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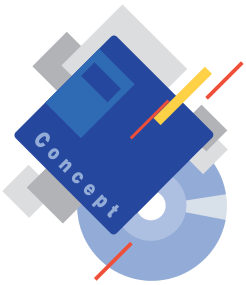
Concept programming software

Simplify the interface to your applications



Momentum is Concept compatible

Concept is a Microsoft Windows® based programming tool set. It provides a single development environment with multiple programming languages for creating control system programs. Using familiar, standardized editors bundled in a single application, you can create and integrate logic, communications, and diagnostics with the same database and a choice of six editors.

Simplify the interface to your applications

Concept meets the requirements of both design and maintenance personnel with powerful tools that include program generation and easy-to-understand encapsulation of complex algorithms. These powerful features add a third dimension to traditional flat ladder logic programs. Application complexity is minimized and maintenance simplified by embedding the complex control structures within basic logic.

Ease of use

Concept provides easy-to-use interfaces, usable programs, powerful search functions, free-form graphics editors, and On-line Help that simplifies writing, documenting, and maintaining your Modicon TSX Momentum control system.

Worldwide uniformity

Concept complies with Microsoft Windows Graphical User Interface (GUI) and IEC 1131-3 standards for programmable logic controllers, so its editors are uniform and simple to use.

Navigate complex programs with ease

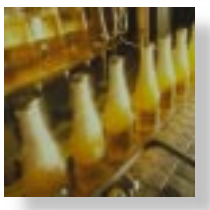
Concept simplifies program development with powerful search functions that allow you to search for variables, discover errors, and identify unused variables. Additional functionality includes Concept's hierarchical structure that simplifies complex programs and provides easy-to-read supervisory overviews.

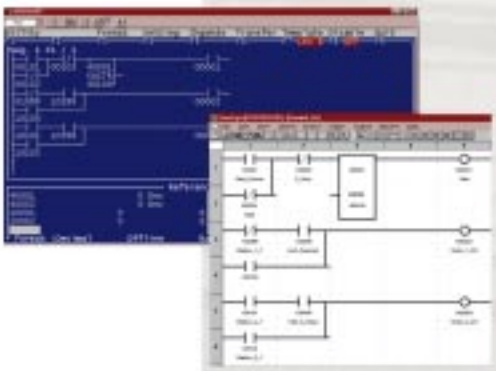
Cuts rising software costs

In recent years, control hardware costs have dramatically decreased, while software has become one of the more expensive parts of the control system. Why? Because of the many hours it takes to develop, document, debug, maintain, and expand system software. Concept reduces your development, design, debug and testing tools to get you on-line faster.

Quick key support

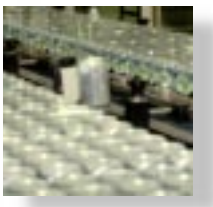
Modsoft compatible Quick Key support for easy insertion of ladder logic instructions has been integrated to maximize productivity for experienced Modsoft users.





Modsoft programming software

DOS-based program development



TSX Momentum is compatible with Modsoft, a DOS based programming software which enables users to perform the following functions:

- Off-line program development
- On-line program maintenance
- Complete user documentation
- I/O Module configuration with I/O Map Zoom
- Function block configuration with DX Zoom
- I/O module health and status monitoring
- Process/Machine diagnostics

Easy-to-learn and use

In addition to powerful functionality, Modsoft is also easy to use. Navigation aids simplify operations for first time users and “hot” keys speed development for more experienced users. By remembering the last performed function, Modsoft’s pop-down menu system helps minimize keystrokes. Tracking help consistently provides an explanation of the selected Menu bar option. In addition, context-sensitive help assists on individual subjects depending on the current mode of operation. I/O wiring diagrams also provide the user with module pinout and power consumption information.

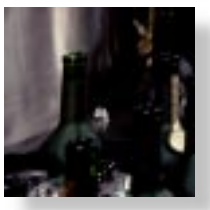
The DX Zoom and I/O Map Zoom features allow users to zoom on a function block or I/O module, providing a full screen presentation of all input and output parameters. For example, parameters can be entered when zooming on the SCIF drum sequencer block. These features act as a reference manual loaded into your computer.

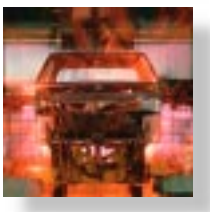
Communications

Modsoft supports several communication techniques. Using standard Modbus communications, Modsoft can communicate with TSX Momentum as well as all other Modicon controllers. Long distance modems and/or telephone lines can also be used for accessing controllers. Modsoft also has native support for Modbus Plus and Ethernet. Communicating with Modicon controllers via the Modbus Plus high speed network delivers an easy method to monitor, archive, and program numerous controllers from one location.

User preference file

Like most modern software tools, users can customize Modsoft to behave differently than the system default. User Level Access may be set to allow eight steps of functional operation, from full programming functionality to program monitor and view only.





Modicon TSX Momentum

Master part numbers and descriptions

I/O Module Bases

Part Number	Description
120 Vac Discrete	
170 ADI 540 50	120 Vac - 16 Point Input Module Base
170 ADM 690 50	120 Vac - 10 Point Input/ 8 Point Output Module Base
170 ADO 530 50	120 Vac - 8 Point Output @ 2A Module Base
170 ADO 540 50	120 Vac - 16 Point Output Module Base
170 ADO 730 50	230 Vac - 8 Point Output @ 2A Module Base
170 ADO 740 50	230 Vac - 16 Point Output Module Base
24 Vdc Discrete	
170 ADI 340 00	24 Vdc - 16 Point Input Module Base
170 ADI 350 00	24 Vdc - 32 Point Input Module Base
170 ADM 350 10	24 Vdc - 16 Point Input/ 16 Point Output Module Base
170 ADM 350 11	24 Vdc - 16 Point Input/ 16 Point Output - Fast Module Base
170 ADM 370 10	24 Vdc - 16 Point Input/ 8 Point Output @ 2A Module Base
170 ADM 390 10	24 Vdc - 16 Point Input/ 12 Point Output - Monitored Module Base
170 ADM 390 30	24 Vdc - 10 Point Input/ 8 Point Relay Output Module Base
170 ADO 340 00	24 Vdc - 16 Point Output Module Base
170 ADO 350 00	24 Vdc - 32 Point Output Module Base
Analog	
170 AAI 140 00	Analog - 16 Channel Single-Ended Input Module Base
170 AAI 520 40	Analog - 4 Channel RDT, Thermocouple, and Mv Input Module Base
170 AAO 120 00	Analog - 4 Channel Output 0-20mA Module Base
170 AAO 921 00	Analog - 4 Channel Output 4-20mA Module Base
170 AMM 090 00	Analog - 4 Channel In/ 2 Channel Out Module Base, with 24 Vdc 4 In/ 2 Out

Communication Adapters

Profibus DP	
170 DNT 110 00	Profibus DP Communication Adapter
FIPIO	
170 FNT 110 00	FIPIO Communication Adapter
Interbus (I/OBus)	
170 INT 110 00	Interbus (I/OBus) Communication Adapter
Modbus Plus	
170 PNT 110 20	Modbus Plus Communication Adapter - Single Port - IEC Data Format
170 PNT 160 20	Modbus Plus Communication Adapter - Redundant Port - IEC Data Format
170 NEF 110 21	Modbus Plus Communication Adapter - Single Port - 984 Data Format
170 NEF 160 21	Modbus Plus Communication Adapter - Redundant Port - 984 Data Format

Processor Adapters

171 CCS 700 00	M1 Processor Adapter, 64K RAM, RS232 Port
171 CCS 700 10	M1 Processor Adapter, Fast CPU, 64K RAM, RS232 Port
171 CCS 760 00	M1 Processor Adapter, 256K RAM, RS232 and I/Obus Ports
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