SUPER MICRO

FX1S-FX1N

PROGRAMMABLE CONTROLLERS

Defining
Control

MITSUBISHI ELECTRIC

Defining Control

Mitsubishi Electric has long been a leader in the manufacture of compact automation controllers, and over the years has built a strong reputation for excellence in quality, functionality, and design. Our high-value solutions are often imitated, but never duplicated, because we recognize that a true leader must continually push the envelope regarding value and performance. And we live by it, as witnessed by introduction of the new FX1S and FX1N controllers. Mitsubishi strives to create the complete customer experience, and thousands of customers rely on us to supply their automation solutions. Our milestone achievement of "4 million units served" validates your choice for Mitsubishi controls.

As an automation partner, Mitsubishi maintains an extensive network of field offices and regional support sites. We employ an experienced team of field engineers and an extended team of highly knowledgeable distributors and system integrators. Mitsubishi's broad support network and solid infrastructure easily handle customer service, support, technical training, product repair, specialized service and consultation. We are well prepared to handle your automation needs today and in the future.

The new FX1S and the FX1N SuperMicro Programmable Logic Controllers now become the latest additions to Mitsubishi's renowned FX Family. All controllers in this family boast integrated I/O, power supply and CPU in a "unitized" package – Mitsubishi invented this genre. With un-matched functionality and reliability, the FX1S and the FX1N bundle enormous value into very small packages. Every model packs an extensive instruction set and abundant user memory for a myriad of control possibilities. No other controller is better suited to tackle modern automation demands in jobs ranging from the simplest and smallest I/O count, to those demanding the pinnacle of complexity and speed.

Installation

The FX1S and FX1N are rugged enough to survive in remote and mobile environments and very compact to meet tight panel space limits. Standard units include flexible mounting points for both DIN rail and direct panel installation.

General Features

- Intuitive and powerful Windows® software (GPP-WIN, FX-WIN) shortens development
- PC Simulation software for convenient program debugging (without the PLC)
- Powerful and flexible connectivity (communications) options
- Worldwide Acceptance – Meets UL, cUL, CE and major shipping standards
- Program and hardware compatible with all members of the FX SuperMicro Family

Basic Hardware

- Large program memory (up to 16kB) and separate device, data and diagnostic memory
- Internal memory requires no battery to retain programs or data (EEPROM)
- Optional external EEPROM memory supports easy program transfer, update, and storage
- 2 onboard potentiometers support manual adjustments without programming or HMI
- Real-Time Clock – For scheduling and data logging, Y3K compliant
- Onboard diagnostic indicators for CPU condition and I/O status
- Onboard Run/Stop switch for convenient status changes (also remote control Run/Stop)
- Powerful computations include 32 bit math and matrix functions
- Extremely fast logic execution of .55 microsecond/step

Communications

- Fieldbus support for CC Link, I/O Link, DeviceNet, Profibus, Can Bus, AS-i, LonWorks
- Networking – PLC to PLC, serial multi-drop (RS-485) up to 16 stations
- 3 embedded communication ports for powerful and flexible connectivity
  - RS-422 programming port
  - RS-232, RS-422, RS-485 flexible port for networking, modems, etc.
  - Embedded monitor device port
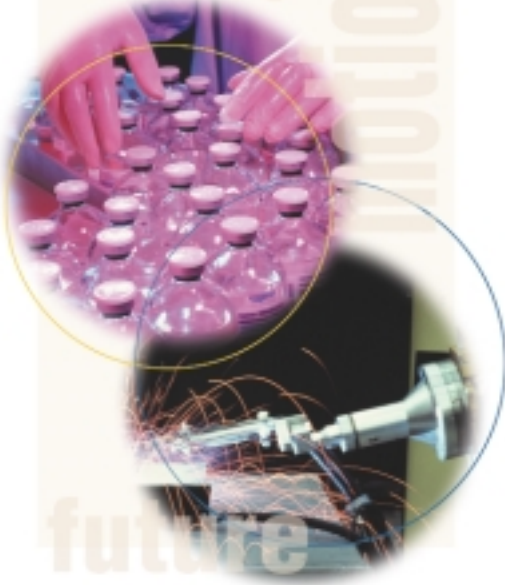
Motion Control and High-Speed Capability

- Additional and enhanced motion control commands
- Dual 100kHz pulse outputs for 2 axis motion control of servos and steppers
- 60kHz high speed inputs (30kHz quadrature encoder inputs)
- Hardware interrupt capability

Process Control

Adaptive tuning PID instruction handles closed loop control (velocity form) FX1N supports the dual loop temperature control module, FX2N-2LC.

Configuration

- FX1S offers AC and DC powered base units ranging from 10 to 30 points
- FX1N offers expandable AC and DC powered base units ranging from 14 to 60 I/O
- FX1N expands to 128 I/O, and supports special function and networking modules
- FX1N can host a network of remote I/O using AS-i or I/O Link

Defining Convenience

Both FX1S and FX1N lines support wide main power ranges from 85-264 VAC or 5-30 VDC. Many models support selection for either sink or source types, and allow adjustment of the input response time by digital filter. Output types include 2A rated relay and, sink or source transistor.

Defining Refinement

Both FX1S and FX1N lines incorporate dual potentiometers on the base unit, to support minor system adjustments by screwdriver, without need for a programming device or operator terminal. For maintenance, the FX1N-5DM display with integral mounting feature, offers access to data memory and devices. For the ultimate in access, choose one of Mitsubishi's powerful and flexible HMI units that can display graphics, messages, alarms, trends, control programs and facilitate more productive machine operation.

Defining Value

The FX1S and FX1N reduce system costs by providing a 24 VDC supply to power sensors or external system devices.

Defining Compatibility

Both families can fulfill almost any requirement or answer any challenge. If you should start a solution and the parameters change or rise beyond the capability of the controller, don't worry, programs created for the FX1S are fully compatible with the FX1N or even the FX2N for that matter. You never grow out of a FX solution, it's designed to grow with you. While the FX1S is great as a stand alone control solution, the expandable FX1N Family adds the ability to use existing modules from the popular FX0N and FX2N Families. The ability to utilize these components and create high-end solutions is now within your grasp. Defining solutions for the next generation.

Defining the Past and Future

The FX1S/1N will take you far into the future with years of reliable service and performance. Mitsubishi retains a strong commitment to promote compatibility across product lines new and old. Since legacy systems are always supported, upgrading from earlier FX0S/FX0N systems to the newer FX1S/1N platform is simple. Click a button and immediately you are ready for the new millennium.

Defining Flexibility
Special Function Modules FX1N Only

The FX1N is able to expand its capability far beyond its local base with connections to extension units as well as specialty modules. A comprehensive range of I/O modules are readily available to satisfy your requirement. Compatibility is seldom a problem, modules are interchangeable across several platforms. The range of limitations doesn't stop at existing FX0N modules, even advanced FX2N modules are compatible with the FX1N. With connectivity for high-precision temperature sensing modules or high-resolution analog, a wide array of solutions can be matched to almost any requirement. Start to open up the possibilities and begin to open a world of understanding.

Solution

Defining Control and Opening Doors to a World of Communications/Networks

The FX1N has the ability to connect numerous open protocols across multiple platforms. Many options are currently available and allow you to choose from a variety of solutions such as:

- CC-Link (FX2N-32CCL)
- I/O Link (FX2N-16LNK-M)
- DeviceNet (FX2N-64DNET)
- ASi-Bus (FX2N-32ASI-M)
- Profibus DP (FX0N-32NT-DP)
- Profibus DP Remote I/O (FX2N-32DP-IF)
- CAN BUS* (FX2N-32COPEN-IF)

* Available December 2000

Defining Your Communication Options

Communication options don't stop at open architecture, popular serial interfaces are readily available for any controller you choose.

- RS-232 (point to point) Option Board – Allows inexpensive connection to modems and telemetry devices. A great gateway interface for SCADA packages not to mention computers and barcode readers.
- RS-485 BD Option Board – Permits users to take advantage of the embedded high performance networking. Configure a simple RS-485 network or even multi-drop numerous PLCs off one host computer. Integrate PC, SCADA or network systems to your controller.
- RS-422 BD Option Board – Allows dual port access to the controller. An excellent interface option for adding HMIs while keeping your programming port free. RS-422 allows for easy integration for SCADA systems, instruments or displays.

RS-485
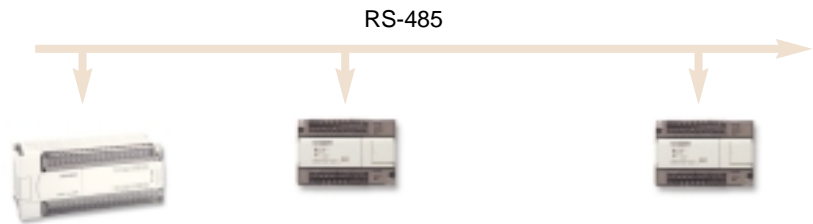
Automatic Networking with FX1S, FX1N, FX0N, FX2N

RS-485
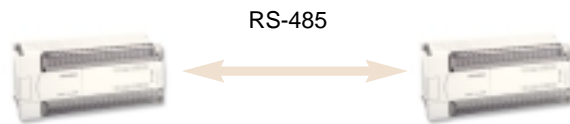
One to One Parallel Link

Computer Master

RS-485

16 Stations over 500 meters
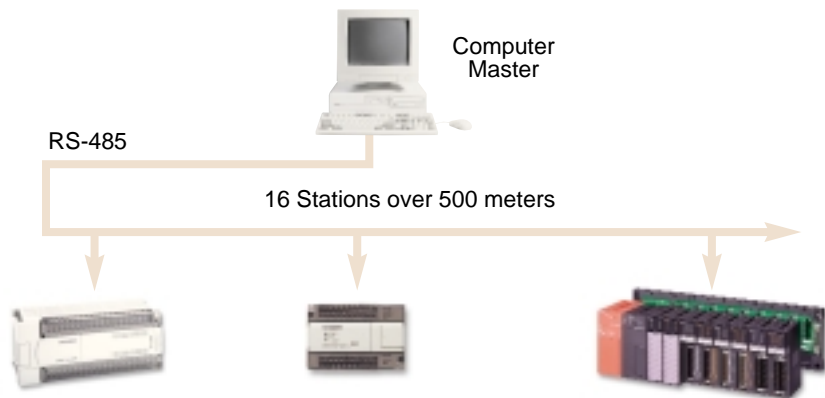
Multidrop Communication with FX0N, FX2N, and A-Series

Hand Held Options

Hand held programming options for the FX Family include the FX-10P-E and the FX-20P-E. Both hand held options come in durable pendant style platforms.

Hand held features:
- On-line and off-line programming support
- 2 (FX-10P-E) or 4 (FX-20P-E) line display capability
- Bright LCD display (FX-20P-E)
- Durable design

Programming Options

Mitsubishi offers a complete selection of programming tools designed to ease the developmental cycle and minimize your time to market. Our programming options allow you to define your application. Select from PC based software titles to hand held programming devices.

GPP-Win Windows-based programming package features:
- Full support for Graphical Ladder, Instructional List, Step Ladder and SFC programming languages
- Comprehensive monitoring capabilities
- On-Line Programming Support – No need to STOP machine controller for program changes and updates
- Broad Range of Documentation Capabilities – Providing detailed printouts of ladder, list, device names, comments and rung statements
- Specialty Module Data Memory Support – Read/Write buffer location from the software
- Project Verification – Allows checking program code before commissioning
- Project Libraries – For commonly used programming procedures
- Modem Support and Assistance – Allows easy setup of modem strings and telephone numbers
- Recipe Loading and Unloading – Manipulate data memory in easy to use recipe files
- Common Windows – Cut, copy and paste functions
- Hot Keys – For commonly used features
- Easy Transition for Legacy Systems – Programs created in previous software titles like MELSEC MEDOC and FX-WIN are easily converted into GPP-WIN programs
- Easy transition for Other Controllers – FX programs can be converted and used in larger rack based controllers
- Ladder Logic Testing (separate program) – Provides an extensive testing environment for analyzing programs before commissioning

GPP·WIN
PLC Programming &
Documentation Software
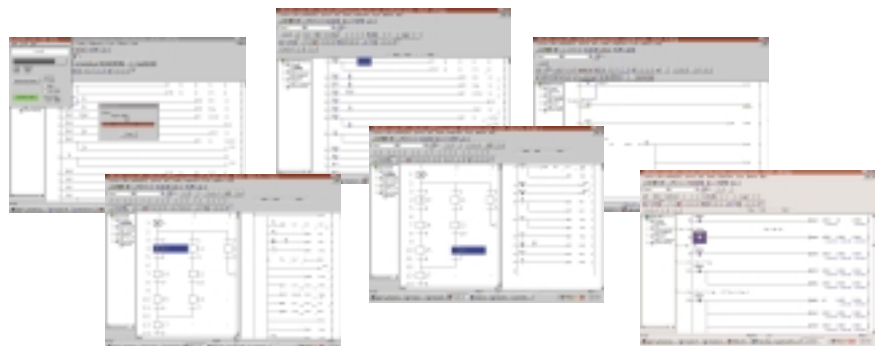
Defining your HMI Options

Human Machine Interfaces or HMIs are perfect complements to any controller or automated system. Mitsubishi provides a comprehensive range of HMI solutions designed to meet the needs of your application and exceed your expectations. Numerous choices are available and range from simple text based interfaces to high-resolution touch screens.

HMI features include:
- Recipe handling
- Security management
- Alarm handling
- Trending

Mitsubishi HMIs are sophisticated windows that allow users to peek into complex processes. Our HMIs require no additional logic for support or display, eliminating complicated or otherwise tricky logic code from the development process. Freeing PLC resources and adding to the overall functionality is where good HMIs are separated from the others. Independent programs are easily maintained using friendly windows programming packages.

The MTA, E & GOT Series of Human Machine Interfaces

These units provide a comprehensive range of options to meet all needs for communicating machine and process information to an operator while allowing full control input. Choices span a complete range from simple, single-line text displays to full color, high resolution touch screens. Common features include rugged metal construction, sealed front panels and an object oriented programming environment. The HMIs make no demands on the PLC resources, since each HMI has its own memory and CPU to support all functions.

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Printed with soy inks

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