**SUPER MICRO FX2N**

# FX2N Series

## PROGRAMMABLE CONTROLLERS

**MITSUBISHI** FX2N-64MR

POWER
RUN
BATT.V
PROG-E
CPU-E

# A New Benchmark In Micro PLC Performance

**MITSUBISHI ELECTRIC**

# The FX2N SuperMicro™ PLC, a strong statement of leadership from Mitsubishi.
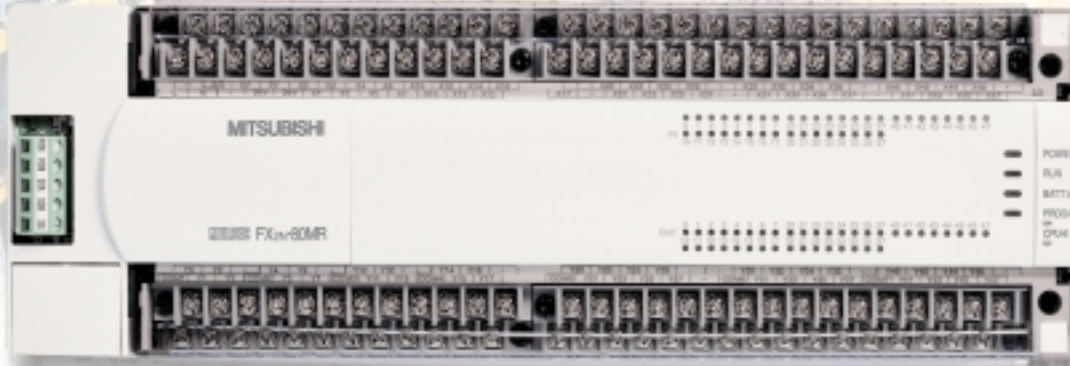
## Maximize your system's value by using our leading edge control solutions.

When you look for a micro PLC, there are many choices, so why choose Mitsubishi? Mitsubishi is the leader in micro PLCs. We invented the first micro, and have shipped close to 3 million of them over the last 20 years. Our wealth of experience and heritage of building the best micro PLCs in the business has led us to create what can only be described as a SUPERMICRO; the FX2N.

## Set Apart from the Rest

The FX2N SuperMicro leads the way in performance, features and value, making it the perfect choice for small and mid-sized applications. It remains price competitive in lower performance applications and truly stands apart when used on the most demanding projects.

## State-of-the-Art Performance and Functionality

- Windows Programming - Use Ladder, List or SFC languages, with FX-WIN or GPP-WIN

- Easy Migration - Programs and development tools interchange with FX, FX0N and FX0S

- Operator Interfaces - Selections to match any application

- Minimized Footprint - Smaller by 50% to cut panel space and cost

- Unmatched Program Memory - 8,000/16,000 steps

- Massive Data Memory - 8000 data registers

- Enhanced Throughput - 80 nanoseconds/step

- Better Process Control - New, auto-tuning PID

- Sophisticated High-Speed Processing - 60Khz counters, 10 ms timed and 50µs hardware interrupts

- High-Function Mathematics - 32 bit floating point, Square Root and Trigonometry

- Embedded Motion Control - 20,000 Hz pulse train, Trapezoidal ramp instructions

- Year 2000 Compliant - Real-time clock/calendar (4-digit year) for scheduling and time stamping

- Flexible Configurations - From 16 to 256 I/O and extensive special function I/O capabilities

- Cost Effective Communications - Built-in 2nd port (RS-232/RS-422/RS-485) and PLC-PLC networking

- Open Network Connectivity - Modules for Profibus DP, Profibus DP I/O, AS-i and CC-Link
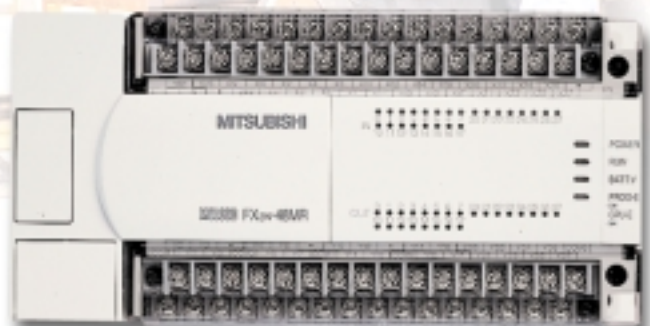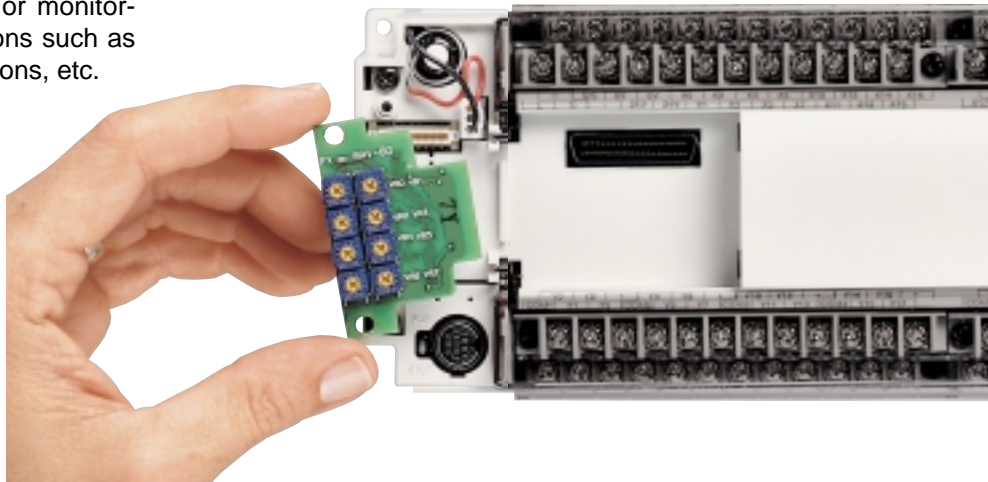
# Compact, Powerful and Versatile

## Overview
### Wide Tolerance Power Supply

The FX2N uses an auto ranging AC power supply (85-264VAC, 50/60Hz) allowing operation on AC current worldwide. 24V DC units will also be available in the near future.

### Communication Adapters Extend Capabilities

• Adding an optional communication adapter card allows communication with external devices such as personal computers, printers, data capture devices and measuring instruments, as well as full networking capabilities.

• RS232C Communication Adapter Card
The FX2N-232-BD allows communication with personal computers, printers and other devices. Also, with the built-in modem setup parameters, a user can configure for remote programming or monitoring, making the FX2N suited to applications such as wide area networks linking pumping stations, etc.

• RS485 Communication Adapter Card
The FX2N-485-BD enables 3 PLC communication options:
  - Automatic PLC to PLC networking with multiple stations
  - Parallel link between 2 PLCs
  - PC to PLC networking for SCADA applications

• RS422 Communication Adapter Card
  - Enables data exchange with measuring instruments, displays and other devices using RS422 communication
  - Alternately, one can use this port for programming or an operator interface

### Common Peripherals

• The FX2N connects directly to most FX0N hardware. FX hardware can be connected with the FX2N-CNV-IF unit. All FX programming tools operate with the FX2N (FX-10/20P-E require V3.00 to access all FX2N functions.) The FX-WIN and GPP-WIN Windows programming tools offer multi-window displays of circuitry, lists and sequential function charts (SFCs).

## Convenient Service Supply

A 24V DC service supply provides power for sensors and other peripherals, thus eliminating hidden costs of additional power supplies.

• Opto-isolation
For increased system protection, the FX2N-CNV-BD allows the connection of opto-isolated FX0N communication adapters. (FX0N-232ADP, FX0N-485ADP)

• FX-8AV-BD
Add the ability to fine tune system parameters without a programmer or operator interface using this 8 potentiometer card.





FX-WIN

GPP-WIN

# Hardware

## Run Time Program Changes

- All FX2N controllers support on-line program-ming functions, used in system development and commissioning. We enhance this with remote programming capability, by modem, which also supports on-line changes. For applications requiring shutdown to make changes, we support RUN/STOP by switch, programmed input, or software.

## Wide Range of Models Available

- All FX2N units come in 6 base unit sizes from 16 to 128 I/O. Versions are available with either AC main power or DC power; AC inputs or DC sink/source selectable inputs; and durable relay outputs, fast response sink/sourcing transistor outputs or even high response Triac outputs.
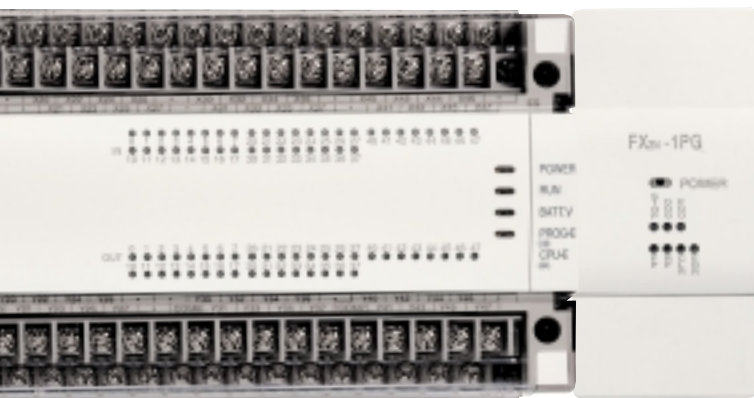


- AC powered expansion units increase expandibility. Available in both relay and transistor output types, the FX2N expansion units quickly add both inputs and outputs to an FX2N system. Also, when the expansion capacity of a base unit is exhausted these units add extra power, allowing the system to be expanded even further, to a maximum of 256 I/O.

- Input and output expansion blocks add flexibility. Drawing their power from the base or expansion units, these optional I/O blocks provide flexibility to meet various system requirements with an I/O ratio suitable for any application. Not only does the FX2N have its own range of expansion blocks, but also the existing FX0N range of blocks can be used, maximizing the types of inputs and outputs available.

## Easy Installation and Maintenance

The FX2N can be installed on DIN rails or directly panel mounted. Removable terminal blocks allow quick unit replacement in the unlikely event of a failure (except on 16 I/O base units).

## Capacious Storage

The FX2N comes with 8K-steps of dedicated program RAM already built in which can be expanded to a massive 16K. This allows space for all machine control functions you need to include to stay ahead. In addition to the standard base unit memory, the FX2N can also use a range of removable memory cassettes which offer the capability to distribute program updates. The following memory types are available:

    FX-RAM-8 (8 or 16K)
    FX-EPROM-8 (8 or 16K)
    FX-EEPROM-4 (4K)
    FX-EEPROM-8 (8K)
    FX-EEPROM-16 (16K)

In addition to the huge program memory, the FX2N also has 8K of dedicated data memory (8,000 data registers).

## Special Function I/O

The FX2N has an extensive range of special function blocks, including all the FX0N special function blocks. With the addition of the FX2N-CNV-IF, the special function blocks for the FX-Series may also be used to increase the range of possible applications.

FX2N Special Function Blocks are available to:
- Read K or J type thermocouples (FX2N-4AD-TC)
- Read PT100 type RTD sensors (FX2N-4AD-PT)
- Read voltage and current analog signals (FX2N-4AD)
- Produce voltage and current outputs (FX2N-4DA)
- Add multiple serial communications ports (FX2N-232IF)
- Perform advanced automated motion control (FX2N-1PG-E)
- Track signals up to 50kHz (FX2N-1HC)
- Add remote I/O (FX2N-16LNK-M, I/O link master)

Additionally, a programmable cam switch (FX2N-1RM-E) is available for either stand-alone use or for use with the FX2N. The FX2N-1RM-E controls up to 48 outputs with resolution of up to 0.5 degrees. Maximum operating speed is 830 rpm.

# Communication and Control

Serial communication has become an increasingly important part of system control. The FX2N communication adapter cards offer a variety of ways to connect the PLC to special devices, personal computers and other systems, while leaving the main programming port free for other uses such as connecting to an operator interface.

## Point to Point Flexible Communication

Direct connection with a personal computer is an essential function for program development or data exchange. With the FX2N-232-BD RS232C serial card, an FX2N can easily be connected with devices such as printers and bar code readers. With its built-in setup parameters, it is also possible to have the FX2N configure a modem for remote programming or monitoring. This is invaluable for establishing networks over wide areas, such as may be required in telemetry applications.

User configured serial communications are also possible with the FX2N-232IF special function block allowing up to 8 additional serial devices to connect to one FX2N system.

FX2N-232-BD

FX2N

RS-232

FX2N-232IF

Personal Computers     Printers     Barcode Readers
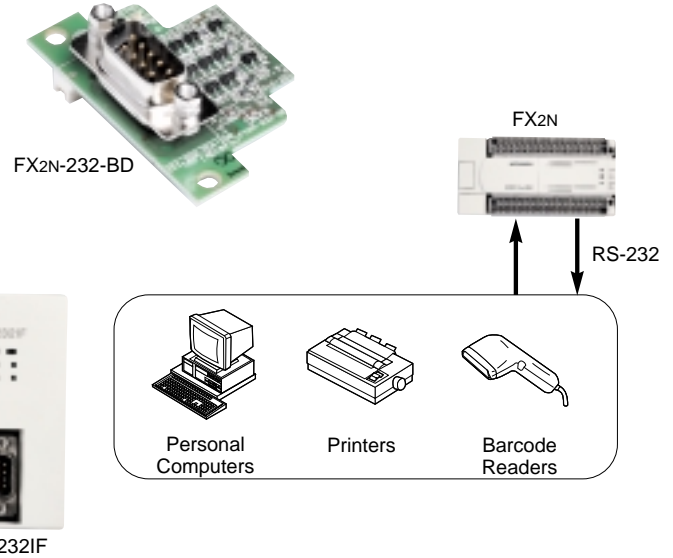
## Dual Port Access
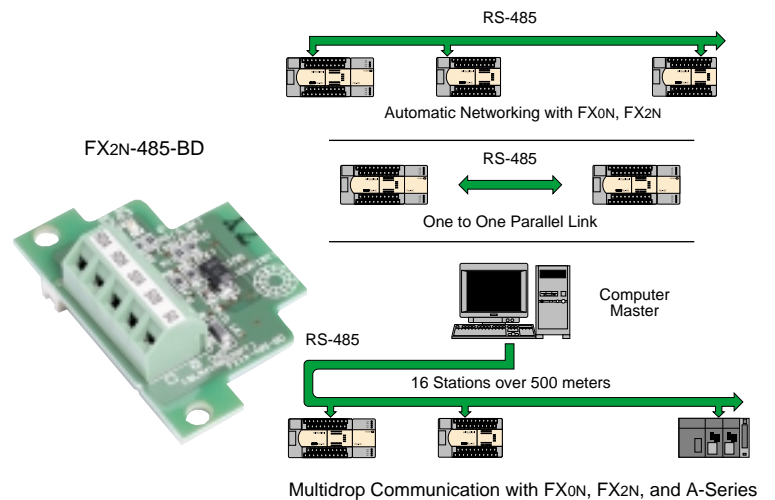
The FX2N-422-BD is essentially a second programming port for the FX2N. With this board, two operator interfaces can be connected to a single unit or connect one OI and keep the other port free for programming. This is an essential requirement for program development with an OI, and during system commissioning. Any existing programming or monitoring tools can be connected (V3.00 FX-10P-E/FX-20P-E required for full FX2N support).

FX2N-422-BD

Personal Computer

FX2N

Operator Interface
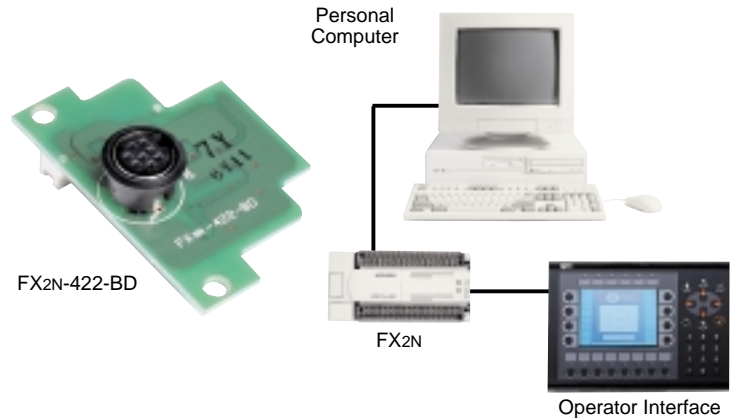
## Network Connectivity and Distributed Control

It is sometimes necessary for two or more machines to coordinate or synchronize operations. This is especially true if they utilize some common equipment and/or data. Adding an FX2N-485-BD to the FX2N allows FX2N/FX0N (V2.00 FX0N) systems to share word and bit data automatically, and still perform independent tasks.

With a computer or similar intelligent device as master, the FX2N-485-BD connects the FX2N to a multi drop network. FX2N or FX0N processors communicate to the master using one of two dedicated protocols. These protocols are also used by the Mitsubishi A-Series computer link units meaning the FX2N can easily be added to any existing AJ71C24 or A1SJ71C24 network.

FX2N-485-BD

RS-485

Automatic Networking with 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

# Programming Tools and O/Is

FX0N-32NT-DP

FX2N-32DP-IF

FX2N-32CCL

## Linking to Open Networks

The need for open network connectivity becomes increasingly widespread. The FX2N controller can interface seamlessly with a wide variety of open protocols. With connections to Profibus and AS-i, the FX2N offers various network solutions. The FX2N even supports Mitsubishi's own engineered high speed networks. With connections to CC-Link and I/O Link the solutions far outnumber the applications.
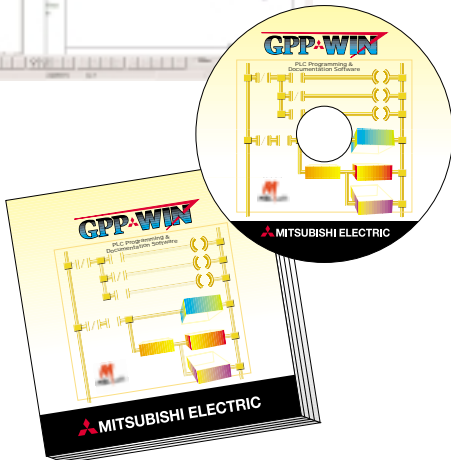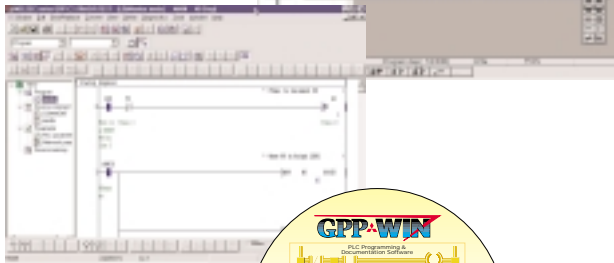
## Computer Based Programming

Mitsubishi offers a selection of programming tools and operator interfaces which are designed to be easy to use, practical and common to all controllers. Select from computer software and hand held devices for programming; select from simple text units or more advanced graphic display units for operator control and information.

FX-WIN
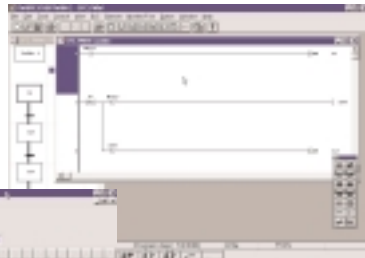
GPP-WIN

## PC Based Programming Tools

We offer two Windows® – based programming packages:

• FX-WIN
• GPP-WIN

FX-WIN is an easy-to-use FX programming tool which includes our SFC programming system. GPP-WIN is a powerful package for all FX and A-Series PLCs.

Both software packages include the following features:

• Full-time help facility provides an explanation at any stage of operation.
• Graphical ladder and instruction list programming.
• Comprehensive monitoring capabilities.
• Program during RUN allows changes to be made to the program without having to STOP the machine.
• Powerful move and copy utilities and time saving editing functions.
• 'Hot' keys for quick access to commonly used features.
• Extensive professional documentation capabilities that provide printouts of ladder, list, device names, comments and program explanations.

In addition to computer software, there are two hand held pendant style programming devices for the FX-Series, the FX-10P-E and the FX-20P-E.

6

# SUPER MICRO FX2N

# FX2N Series

## PROGRAMMABLE CONTROLLERS

**Corporate Headquarters:**

Mitsubishi Electric Automation, Inc.
500 Corporate Woods Parkway
Vernon Hills, IL 60061
Phn: (847) 478-2100
Fax: (847) 478-2253
www.meau.com

Mitsubishi Electric Automation, Inc.
4299 14th Avenue
Markham, Ontario L3R 0J2
Phn: (905) 475-7728
Fax: (905) 475-7935

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