



The IT M@chine Controller™



This document is based on the version of FA-M3R as of April 2003.
For details about the current version of FA-M3R, please contact your
nearest distributor or agency.



Concept

The IT M@chine Controller™

IT will change your Machine.

The IT M@chine Controller™

*FA-M3R Range-free Multi-controller will change
Your Machine into “M@chine”!!*



The IT M@chine Controller™ is registered trademark of
Yokogawa Electric Corporation.

TI 34M6A06-01E



Solutions

The IT M@chine Controller™

- ***Solution to make the machine to be ready for “IT”***

Easy access to the machine located at the remote area via Internet by Remote OME*.
Ethernet Interface Module (F3LE11-0T) and WideField2 (SF620-JCW) realize
the Remote Maintenance by e-Mail.

*Remote OME (Remote Operation, Maintenance and Engineering) is to maintain the system located remote area,
which is developed and promoted by Yokogawa Electric Corporation and registered trademark of Yokogawa.
- ***Solution to upgrade the machine functionality and performance***

High Speed, High Performance and enhancement of machine tact time
High Speed Start-up/High Pulse Rate Output, S-curve for the shortening positioning
is achieved by the new multi-channel positioning modules (F3YP14-0N and F3YP18-0N)
- ***Solution to enhance efficiency of Development, Re-usability and
Maintenance.***

From Re-use of Program Components to the Re-use of the Data Structure
Add remarkable functions and features to WideField2 and Sequence CPU modules
(F3SP28-3S/F3SP38-6S/F3SP53-4S/F3SP58-6S/F3SP59-7S) in addition to the
Object Ladder Program.

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Remote OME* on Internet Solution for “IT M@chine”

*Remote OME (Remote Operation, Maintenance and Engineering) is to maintain the system located remote area, which is developed and promoted by Yokogawa Electric Corporation and registered trademark of Yokogawa.

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Problems on the existing Remote OME

The existing Remote OME is a system to provide you with the virtual maintenance environment by the Intranet or Dial-up router.

However, there are still some problems such as:

Problems

- Difficulties in the system set-up***
 - Line and network cabling
 - Set-up Dial-up Router and Modem
 - Knowledge on network
- Running Cost***
 - Long distance call
 - Maintenance cost of the equipment
- Lack of maintenance function and tool***

It has been difficult for the customers to establish the Remote Maintenance system.

Finally it leads:

- Increase of business trip***
- Increase of machine shut-down***

The Remote OME on Internet will provide you with solutions.

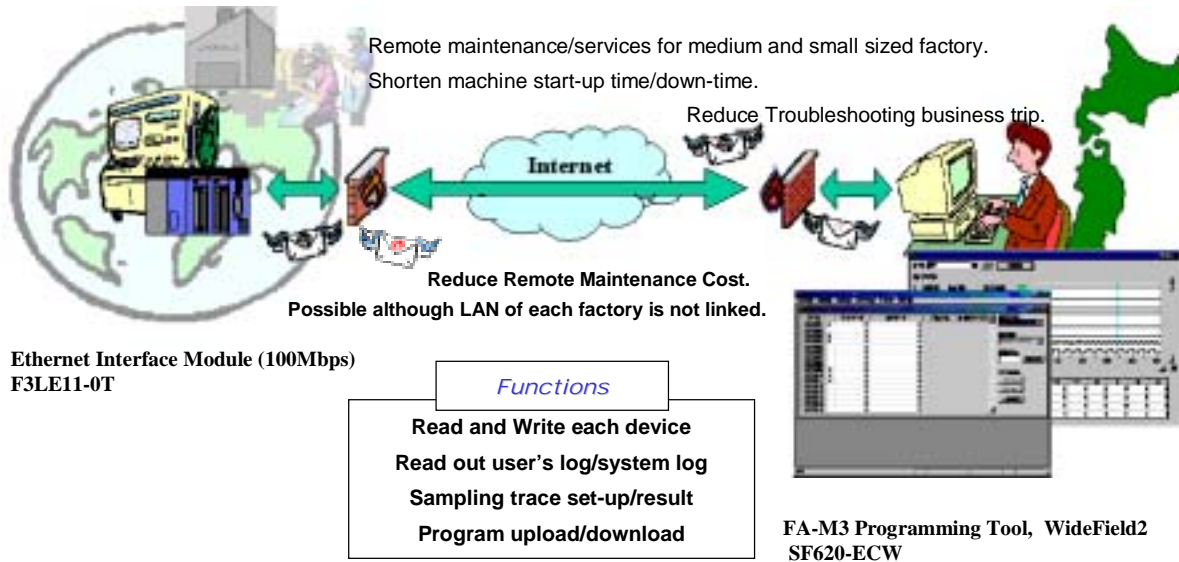
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Remote OME on Internet

The IT Machine Controller

Remote maintenance by e-mail via internet, which can be sent to and received from all over the world.



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Remote OME on Internet

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Features

- ❑ **Easy Remote Access to the machine by e-mail**
 - Remote Maintenance will be available by e-mail only when the machine and maintenance PC are installed at the network with e-mail facilities.
 - No need of troublesome firewall setting due to e-mail maintenance.
- ❑ **Access to the system all over the world through internet**
 - You can access to the machine or system all over the world by e-mail maintenance.
- ❑ **No extra communication cost and equipment**
 - When the system is installed at the LAN with internet environment, no more extra communication cost such as long distance call and/or no more extra equipment such as routers or modem will not be required.
- ❑ **Set-up/monitor Logic Analyzer like functions**
 - Sampling Trace can detect and read out the device changes by a certain trigger like Logic Analyzers. It can be set-up and monitored by e-mail.



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Remote OME on Internet (Easy set-up)

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Easy set-up under e-mail environment

E-mail initial set-up



Easy initial set-up for e-mail

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Remote OME on Internet (User's log/System log)

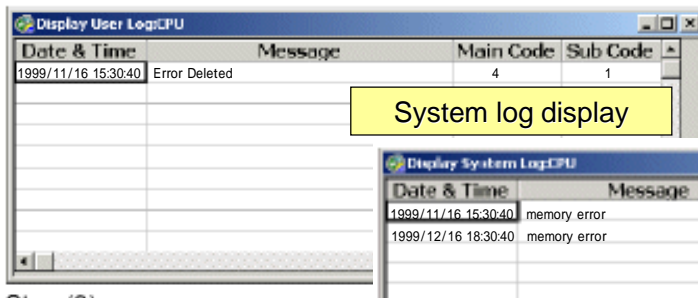
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Monitor the status of the machine and controller by the log.

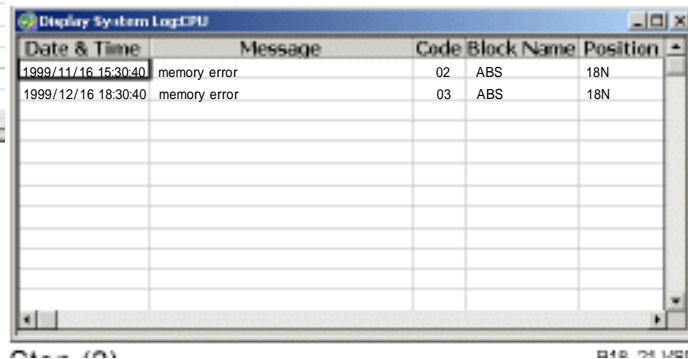
By e-mail

User's log display

Easy to read out user's log/system log



System log display



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Remote OME on Internet (Device Monitoring)

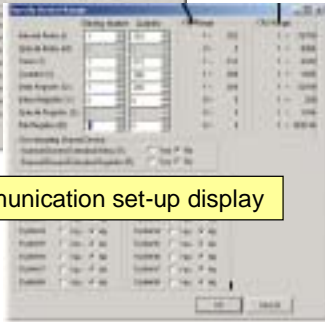
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Monitor and Analyze the machine

Download communication set-up display



Upload communication set-up display



By e-mail

Read and Write each device easily.

Device Monitor Display

Address	Write	Word Data	Long Word Data	Block Name	Local Device	Display Device
IOB01	GF	1	10871			10871
IOB02	GF	1	5835			5835
IOB03	GF	1	2817			2817
IOB04	GF	1	1250			1250
IOB05	GF	1	820			820
IOB06	GF	1	314			314
IOB07	GF	1	157			157
IOB08	GF	1	70			70
IOB09	GF	1	39			39
IOB10	GF	1	19			19
IOB11	GF	1	9			9
IOB12	GF	1	4			4
IOB13	GF	1	2			2
IOB14	GF	1	1			1
IOB15	GF	1	0			0
IOB16	GF	1	0			0
IOB17	GF	1	0			0
IOB18	GF	1	0			0
IOB19	GF	1	0			0
IOB20	GF	1	0			0

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Remote OME on Internet (Sampling Trace)

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Remote analysis like Logic Analyzer

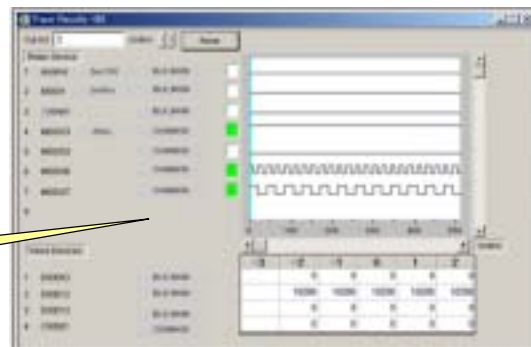
By e-mail

Sampling Trace set-up display



Easy set-up and result for Sampling Trace

Result of Sampling Trace



Confirm the status and movement of the machine before, after and during the trouble.

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Ethernet Interface Module

The IT Machine Controller

In compliance with IEEE802.3 (10BASE-T/100BASE-TX) E-Mail function by SMTP/POP3

Features

- ***Remote OME on Internet***
 - Remote Maintenance by e-mail
- ***Alarm Mail Function/Sending e-mail by the pr***
 - F3LE11-0T monitors CPU module and sends e-mail in abnormal conditions.
 - Sending e-mail from ladder program
- ***100Mbps communication***
 - High Speed Communication at 100Mbps



F3LE11-0T



Machine Tact Time Enhancement

Solutions for High End/High Performance Machine Control

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Shortening Machine Tact Time

Max. 8 axes position control Cost Effective Control by High Speed and High Performance

- ❑ ***Enhancement of Machine Performance by High Speed Start-up***
 - High Speed Internal Processing in the module realizes the **high speed start-up time of pulse output, 0.09ms per axis.**
 - More than 60 times faster than our existing positioning modules.
 - Further enhancement on the machine tact time together with ultra high speed CPU.

- ❑ ***Precise Manufacturing and minimum manufacturing error***
 - **4Mpps (first in the world)** for linear or DD motor.
 - 16 times faster and more precise than our existing product

- ❑ ***Easy and speedy position control***
 - Smooth position control by the “**Smooth S curve acceleration/deceleration**”
 - Enhancement of the machine tact time by the unique function

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New Positioning Module

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Features

- **High Speed Start-up Time**
 - 0.09ms for one axis control
 - 0.25ms for four axes control
 - 0.5ms for eight axes control
- **High Speed Pulse Output Rate**
 - Max. 4M pps (for servo motors)
 - Max. 500kpps (for pulse motors)
- **S-curve acceleration/deceleration**
 - Smooth movement and shortening acceleration /deceleration time by S-curve acceleration /deceleration



F3YP14-0N F3YP18-0N

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Positioning Modules

The IT Machine Controller

Module	Features	Motors
F3NC11 F3NC12	<ul style="list-style-type: none"> •Open Loop Control •Quality Control -Short Response Time (Start-up: 6ms), On-route mode operation, control mode change by the external trigger. -Multi axes linear interpolation, Acceleration/Deceleration: trapezoidal, S-shape -Position Control, Velocity Control and Velocity/Position Control Switching 	
F3YP14 F3YP18	<ul style="list-style-type: none"> •Open Loop Control •Max. 8 axes position control by a single module (Max. 288 axes per system) - Short response time (Start-up: 0.09ms), Multi-axes Linear Interpolation. NEW Acceleration/Deceleration: trapezoidal, S-shape 	
F3NC51 F3NC52	<ul style="list-style-type: none"> Closed Loop Control Quality Control -Short Response Time (Start-up: 6ms), On-route mode operation, control mode change by the external trigger. -Multi axes linear interpolation, Acceleration/Deceleration: trapezoidal, S-shape -Position Control, Velocity Control and Velocity/Position Control Switching 	
F3DA**	Velocity Control with an inverter	

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Enhancement of Reusability

Solutions to upgrade development efficiency, reusability and maintenance

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Engineers' issues

- *Machine upgrade brings more process other than I/O accesses together with increase of program size.*
 - How to optimize data table access?
 - How to keep addresses at addition or deletion of devices?
 - How to optimize the index qualification?
- *Logic becomes more complex according to machine upgrade.*
 - How to optimize debugging by visualization?
 - How to handle device addresses as parameters?
 - How to make input conditions components?
- *Debugging becomes more troublesome by the program size increase.*
 - How to optimize monitoring advanced function modules?
 - How to download comments and/or signal names?

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FA-M3 Programming Tool WideField2 (SF620-ECW)

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WideField was developed to reduce TCO (Total Cost Ownership) in Machine customization.

To enhance reusability of customers' application software assets with evolution Of the former WideField,

WideField2 comes up now!



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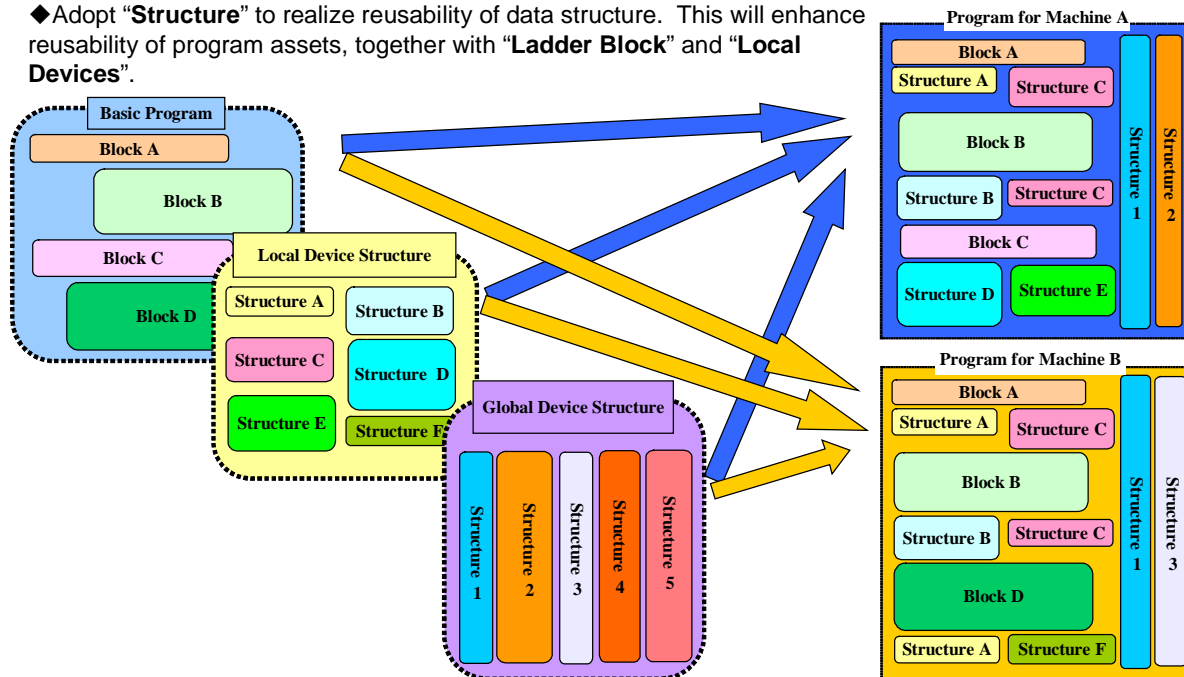


Enhancement of Object Ladder

The IT Machine Controller

Enhancement of Reusability by Independent Blocks and Data Structure

◆ Adopt “**Structure**” to realize reusability of data structure. This will enhance reusability of program assets, together with “**Ladder Block**” and “**Local Devices**”.



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Features of WideField2

The IT Machine Controller

Features

- **Supporting Structure Function**
 - “Structure” is available as data type. An address will be automatically assigned to each “Structure”. Monitor each “Structure” by the registered monitor.
- **Signal Name Management**
 - Supporting input function in advance for Signal Names. Definition can be made block by block. Blocks can be reused based on the Signal Names.
- **E-Mail Debugging**
 - Supporting “Remote OME on Internet”.
- **“Structured Macro” realizes data exchanges between “Structures”**
 - Enhanced reusability by the data exchanges between “Structures” by the “Structured Macro Instructions”
- **Programs to be Components**
 - Programs become easily common with the indirect definition. Input macro instruction will make the program a component.
- **Optimize debugging and maintenance**
 - Circuit, Sub-comments and Signal Definition can be saved in the CPU module. Enhance the maintenance. Reduce debugging time by the partial download.

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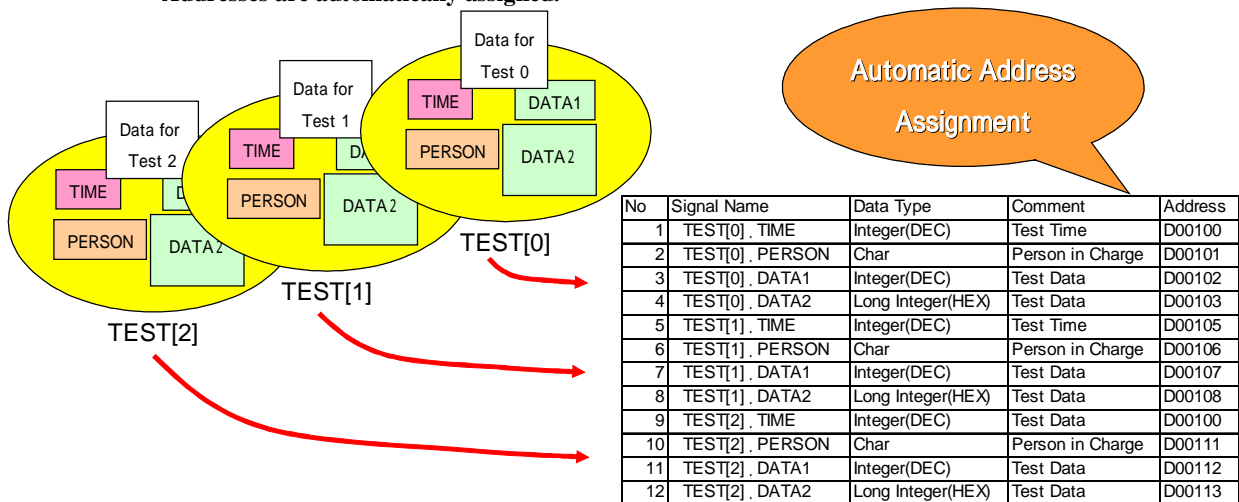


What is “Structure”?

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Define Device (Relay Registers) as Group.

- Define Device Group (Structure) by equipment or by line. Easy to grasp the meaning of Signal by the program source.
- When adding data to the Structure, just add the data processing. No need of existing data (signal) confirmation or modification.
- Addresses are automatically assigned.



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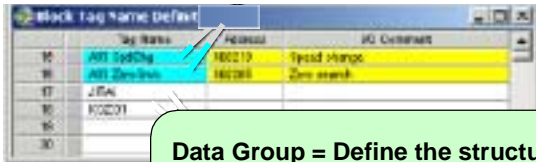
New Feature of WideField2 - Structure

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WideField2 realizes ultimate readabilities by "Structure" similar to C-language, which is specially arranged for PLC environment.

Structure Definition

Define the name, data type and comments of the members.



Data Group = Define the structure "Test".
Definition orders can be defined as well.

Actual Definition of Structure

Standard addresses are to be automatically assigned as a group for orders and combination.

No	Signal Name	Data Type	Comment	Address
1	TEST[0].TIME	Integer(DEC)	Test Time	D00100
2	TEST[0].PERSON	Char	Person in Charge	D00101
	.DATA1	Integer(DEC)	Test Data	D00102
	.DATA2	Long Integer(HEX)	Test Data	D00103
	.TIME	Integer(DEC)	Test Time	D00105
	.PERSON	Char	Person in Charge	D00106
	.DATA1	Integer(DEC)	Test Data	D00107
	.DATA2	Long Integer(HEX)	Test Data	D00108
	.TIME	Integer(DEC)	Test Data	D00100
10	TEST[2].PERSON	Char	Person in Charge	D00111
11	TEST[2].DATA1	Integer(DEC)	Test Data	D00112
12	TEST[2].DATA2	Long Integer(HEX)	Test Data	D00113

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Programming Sample - Structure

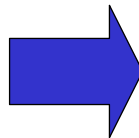
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Programming with visualization
Efficient debugging for index qualification

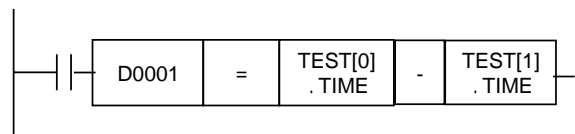
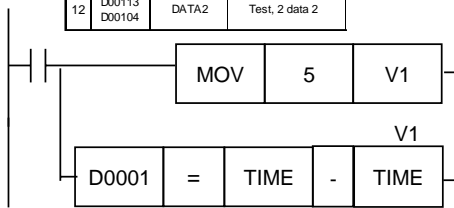
Data (Test data) is read and written by index qualification.

Easy programming by Structure.

No	Addresses	Signal Name	Comment
1	D00100	TIME	Test, 0 hour
2	D00101	PERSON	Test, 0 Person
3	D00102	DATA1	Test, 0 data 1
4	D00103 D00104	DATA2	Test, 0 data 2
5	D00105	TIME	Test, 1 hour
6	D00106	PERSON	Test, 1 Person
7	D00107	DATA1	Test, 1 data 1
8	D00108 D00109	DATA2	Test, 1 data 2
9	D00110	TIME	Test, 2 hour
10	D00111	PERSON	Test, 2 Person
11	D00112	DATA1	Test, 2 data 1
12	D00113 D00104	DATA2	Test, 2 data 2



No	Signal Name	Data Type	Comment	Address
1	TEST[0].TIME	Integer(DEC)	Test Time	D00100
2	TEST[0].PERSON	Char	Person in Charge	D00101
3	TEST[0].DATA1	Integer(DEC)	Test Data	D00102
4	TEST[0].DATA2	Long Integer(HEX)	Test Data	D00103
5	TEST[1].TIME	Integer(DEC)	Test Time	D00105
6	TEST[1].PERSON	Char	Person in Charge	D00106
7	TEST[1].DATA1	Integer(DEC)	Test Data	D00107
8	TEST[1].DATA2	Long Integer(HEX)	Test Data	D00108
9	TEST[2].TIME	Integer(DEC)	Test Data	D00100
10	TEST[2].PERSON	Char	Person in Charge	D00111
11	TEST[2].DATA1	Integer(DEC)	Test Data	D00112
12	TEST[2].DATA2	Long Integer(HEX)	Test Data	D00113



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New features of WideField2 – Input Macro

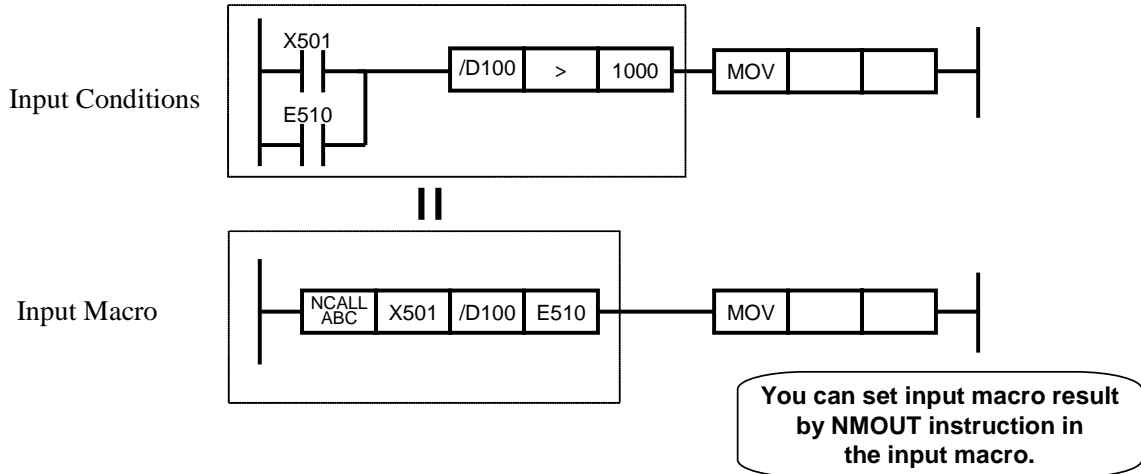
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Enhance reusability and visualization by Input Macro

Macro for input conditions

Reuse frequent input conditions

Visualization – compact input conditions



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New Feature of WideField2 – Indirect Assignment

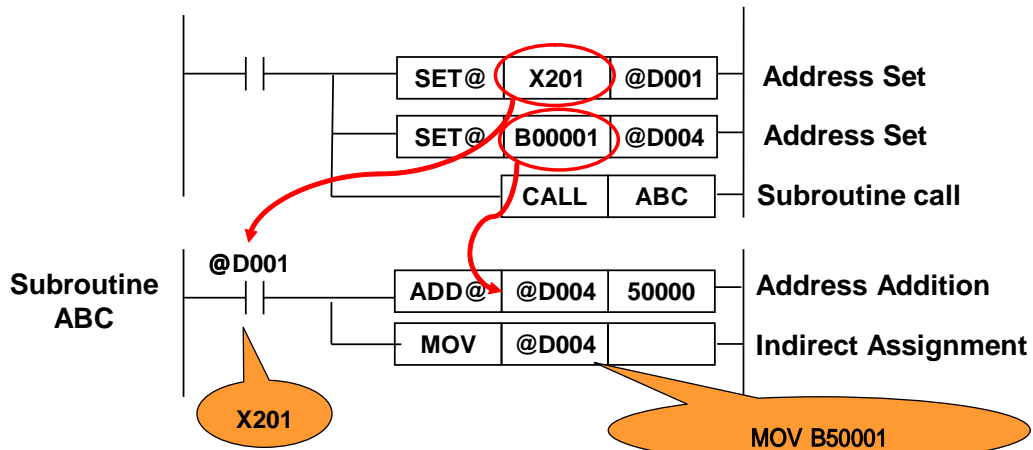
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Pass a device to a subroutine as an argument.

Visualization of argument and enhancement of program reusability.

Address qualification similar to C-language Pointer leads to

Enhancement of program reusability.



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New features of WideField2 – Comment Download

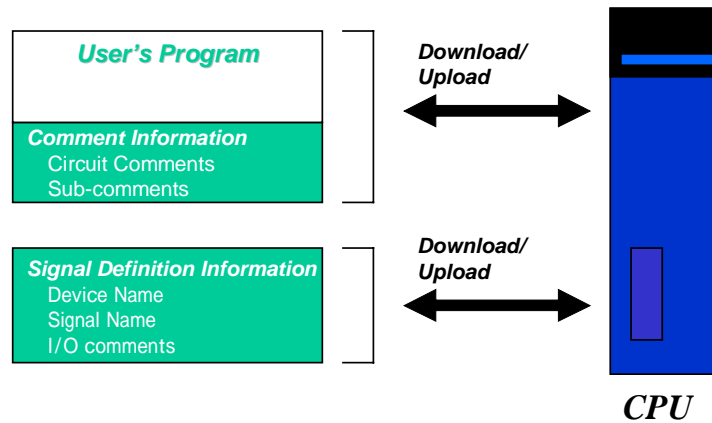
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Upload/Download ladder program with all comments

To and from Sequence CPU/ROM Pack.

Easy maintenance by the other PC with ladder program

And comments by uploading from CPU/ROM Pack.



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Sequence CPU Module

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Features

- *Support Structure Function*
- *Max. 254K steps ladder program*
- *Signal Names and Comments download/upload : Easy Debugging (Structure download/upload possible)*



F3SP28-3S/F3SP38-6S/F3SP53-4S/F3SP58-6S/F3SP59-7S

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New and old Sequence CPU modules

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WideField2 Online functions and CPU Module availabilities		
WideField2 Main Function	New CPU	Old CPU
Structure	YES	NO
Block Capacity 56K steps		
Increase of comments		
Increase of macros		
Partial transfer		
IL instruction nesting		
Indirect Assignment		
Constant Index		
Input Macro		
Date and Time Set instruction		
Comment/Signal Definition		
Remote OME on Internet (F3LE11)		
Common Signal Definition Reference		
Advanced Module Monitor		
Register Monitor		
Concurrent on-line edit by multiple PCs		
Disablecircuit edit/monitor simultaneou activation		
New CPU: F3SP38-3S, F3SP38-6S, F3SP53-4S, F3SP58-6S, F3SP59-7S		
Old CPU: F3SP21-0N, F3SP28-3N, F3SP38-6N, F3SP58-6H, F3FP36-3N, F3SP25-2N, F3SP35-5N		
WideField: SF610-ECW		
WideField: SF620-ECW		



Other New Products

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Memory Card Module

Large data can be used for various PC application.

Features

- ***Standard Compact Flash Memory can be used.***
 - Cost effective and easily procured from the market.
- ***Easy data exchange with PC***
 - FAT16 file system: easy to handle the files at PC
 - Files produced by PC can be handled at FA-M3R.
- ***Maintenance Function***
 - Program and devices can be easily uploaded/downloaded without ladder program.
- ***Wide variation for the system configuration***
 - Access to the device information on multiple CPUs by a memory card module.
 - Access to multiple memory card modules by a CPU module.



F3EM01-0N

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Power Supply Module (Large Capacity Type)

The IT Machine Controller

For Advanced or High Performance Modules

Features

- **5V, 6A large capacity power supply**
 - FA-M3R has a lot of new advanced or high performance modules which need larger power supply.
 - To respond to this requirement, 5V, 6A large capacity power supply is added. 40% increase in capacity is upgraded in comparison with existing power supply modules.
- **Input Power Range Free**
 - As same as the existing power supply modules, input power range is from 100VAC to 240VAC.



F3PU30-0N

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ROM Pack

The IT Machine Controller

New ROM Packs are available for new CPU.

Feature

- **For 254k steps ladder program**

Model	Specifications
RK10-0N	Ladder 5K steps (for F3SP08/21)
RK30-0N	for F3BP20
RK33-0N	Ladder 30K steps (for F3SP08/21/28/38/53/58/59)
RK53-0N	for F3BP30
RK73-0N	Ladder 120K steps (for F3SP38/58/59)
RK93-0N	Ladder 254K steps (for F3SP38-6S/58-6S/59-7S) *

NEW

* Cannot be used with F3SP38-6N and F3SP58-6N

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New Products

The IT Machine Controller

Description	Model	Specifications
Ethernet Interface Module	F3LE11-0T	10/100Mbps , 10BASE-T/100BASE-TX
Positioning Module (Multi-channel Pulse Output)	F3YP14-0N	4 axes, max. 499.75kpps (Pulse Motor)/3.998Mpps (Servo Motor)
	F3YP18-0N	8 axes, max. 499.75kpps (Pulse Motor)/3.998Mpps (Servo Motor)
FA-M3 Programming Tool WideField2	SF620-ECW	For Windows 95, 98, Me, NT, 2000, English Version, CD-Rom
Sequence CPU Module	F3SP28-3S	Ladder 30 K steps, basic instructions 0.045 micro sec. With memory
	F3SP38-6S	Ladder 120 K steps, basic instructions 0.045 micro sec. With memory
	F3SP53-4S	Ladder 56 K steps, basic instructions 0.175 micro sec. With memory
	F3SP58-6S	Ladder 120 K steps, basic instructions 0.175 micro sec. With memory
	F3SP59-7S	Ladder 254 K steps, basic instructions 0.175 micro sec. With memory
ROM Pack	RK93-0N	Ladder 254 K steps, (F3SP38-6S/53-4S/59-7S)
Memory Card Module	F3EM01-0N	Media: Compact Flash
Power Supply Module	F3PU30-0N	100-240VAC (9.13,16 slots) Output Ratio: 5VDC/6.0A