Cat. No. V231-E1-03

SYSMAC
WS02-SPTC1-V1

SPU-Console Ver. 1.3

OPERATION MANUAL

OMRON

WS02-SPTC1-V1
SPU-Console Ver. 1.3

Operation Manual

Revised August 2006

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

⚠DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

⚠WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.

⚠Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

OMRON Product References

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation “Ch,” which appears in some displays and on some OMRON products, often means “word” and is abbreviated “Wd” in documentation in this sense.

The abbreviation “PLC” means Programmable Controller. “PC” is used, however, in some Programming Device displays to mean Programmable Controller.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note Indicates information of particular interest for efficient and convenient operation of the product.

1,2,3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

Unit Versions of SPU-Console

Unit Versions and SPU-Console

Model		CS1W-SPU01/SPU02			CJ1W-SPU01
Unit version		Unit Ver. 1.0	Unit Ver. 1.2	Unit Ver. 1.3	Unit Ver. 1.3
SPU-Console	SPU-Console Ver. 1.0	Can be connected.	Cannot be connected.	Cannot be connected.	Cannot be connected.
	SPU-Console Ver. 1.2	Can be connected, but there are some limitations. (Operates as SPU-Console Ver. 1.0.)	Can be connected.	Cannot be connected.	Cannot be connected.
	SPU-Console Ver. 1.3		Can be connected, but there are some limitations. (Operates as SPU-Console Ver. 1.2.)	Can be connected.	Can be connected.

Note

1. It is not possible to connect to a SYSMAC SPU Unit with unit version 1.3 from SPU-Console versions lower than 1.3. Use SPU-Console version 1.3 to connect to a SYSMAC SPU Unit with unit version 1.3.
2. It is possible to connect to a SYSMAC SPU Unit with a unit version earlier than 1.3 from SPU-Console version 1.3, but the SPU-Console's operations will be limited to SPU-Console operations for the lower unit version.

SPU-Console Version Upgrade

The SPU-Console has been upgraded from version 1.3 to 1.32. The following table shows the changes made in the upgrade.

Item	SPU-Console Ver. 1.3 or lower	SPU-Console Ver.1.32
SPU- Console startup window	Starts from the Connection Dialog Box.	Starts from the Project Explorer Window.
List of SPU Units to connect	Connection Dialog Box	*SPU Unit List* on the left side of the Project Explorer Window
List of SPU Unit settings saved in the computer	Offline edit Dialog Box	*Project List* on the right side of the Project Explorer Window

The SPU-Console has been upgraded from Ver. 1.2 to Ver. 1.3. The following table shows the changes made in the upgrade.

Item	SPU-Console Ver. 1.2	SPU-Console Ver. 1.3
Support for CJ-series CJ1W-SPU01 SYSMAC SPU Units	No	Yes
Importing and exporting registered contents of connected Units	No	Yes
Connection confirmation (connection status, error contents)	No	Yes

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About this Manual:

This manual describes the installation and operation of the WS02-SPTC1-V1 SPU-Console Version 1.3 (setting and monitoring software) for the CS1W-SPU01 and CS1W-SPU02 SYSMAC SPU Units and includes the sections described below.

Please read this manual and all related manuals listed in the following table, and be sure you understand the information provided before attempting to install or operate an SYSMAC SPU Unit using the SPU-Console. Be sure to read the precautions provided in the following section.

Precautions provides general precautions for using the SPU-Console, SYSMAC SPU Unit, Programmable Controller, and related devices.

Name	Cat. No.	Contents
WS02-SPTC1-V1 SPU-Console Ver. 1.3 Operation Manual (this manual)	V231	Describes the installation and operation of the SYSMAC SPU-Console Ver. 1.3.
CS1W-SPU01/SPU02 SYSMAC SPU Units Operation Manual	V229	Describes the installation and operation of the SYSMAC SPU Units.
WS02-EDMC1 SYSMAC SPU Data Management Middleware User's Manual	V232	Describes the installation and operation of the SYSMAC SPU Data Management Middleware (EDMS).

Section 1 provides an overview of the SPU-Console and describes the operating environment, including computer system requirements.

Section 2 describes procedures for installing and uninstalling the SPU-Console, SPU-Console starting methods, and the basic SPU-Console window configuration.

Section 3 describes how to make initial settings for SYSMAC SPU Units.

Section 4 describes the SYSMAC SPU Unit's operating modes, including procedures for confirming and changing the operating mode.

Section 5 describes the methods used for connecting the SPU-Console to SYSMAC SPU Units, managing SYSMAC SPU Unit connections, editing settings offline, transferring setting files between the SPU-Console and SYSMAC SPU Units, and recording files.

Section 6 describes the methods used to execute commands for SYSMAC SPU Units.

Section 7 introduces the SYSMAC SPU Unit's Sampling Mode.

Section 8 describes how to monitor SYSMAC SPU Unit operating status and error status.

Section 9 explains how to make the sampling settings for Sampling Mode operation.

Section 10 describes how to display trend graphs based on sampling files that have been collected.

Section 11 describes how to set the system settings and FINS network settings.

Section 12 provides a list of the commands that are supported for SYSMAC SPU Units.

Section 13 introduces the SYSMAC SPU Unit's Data Storage Mode.

Section 14 describes how to monitor SYSMAC SPU Unit operating status and error status.

Section 15 explains how to make the data collection settings for Data Storage Mode operation.

Section 16 provides information on operating trend graphs for data collection.

Section 17 provides information on Unit settings for data collection.

Section 18 provides a list of the commands that are supported for SYSMAC SPU Units in Data Storage Mode.

The ***Appendices*** provide troubleshooting methods for SYSMAC SPU Unit errors and troubleshooting connections between the SPU-Console and SYSMAC SPU Units, and describes the SYSMAC SPU Unit's network-shared folder configuration. Information is also provided on changing from SPU-Console Ver. 1.0 or Ver. 1.2 and refreshing the system program.

⚠ WARNING Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PRECAUTIONS

This section provides general precautions for using the SPU-Console Ver. 1.2 and the CS1W-SPU01 and CS1W-SPU02 SYSMAC SPU Units.

The information contained in this section is important for the safe and reliable application of SPU-Console and SYSMAC SPU Units. You must read this section and understand the information contained before attempting to set up or operate an SYSMAC SPU Unit using the SPU-Console.

1 Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of installing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of managing FA systems and facilities.

2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.

Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.

Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.

This manual provides information for programming and operating the Unit. Be sure to read this manual before attempting to use the Unit and keep this manual close at hand for reference during operation.

⚠ WARNING It is extremely important that a PLC and all PLC Units be used for the specified purpose and under the specified conditions, especially in applications that can directly or indirectly affect human life. You must consult with your OMRON representative before applying a PLC System to the above-mentioned applications.

3 Safety Precautions

⚠WARNING Do not attempt to take any Unit apart while the power is being supplied. Doing so may result in electric shock.

⚠WARNING Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.

⚠WARNING Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock.

⚠Caution Execute online editing only after confirming that no adverse effects will be caused by extending the cycle time. Otherwise, the input signals may not be readable.

⚠Caution Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.

⚠Caution Tighten the screws on the terminal block of the AC Power Supply Unit to the torque specified in the operation manual. The loose screws may result in burning or malfunction.

4 Operating Environment Precautions

⚠Caution Install the SYSMAC SPU Unit correctly as described in the *CS Series PLC Operation Manual* or *CJ Series PLC Operation Manual*.

5 Application Precautions

Observe the following precautions when using the SYSMAC SPU Unit.

⚠WARNING Always heed these precautions. Failure to abide by the following precautions could lead to serious or possibly fatal injury.

- Always connect to a ground of 100 Ω or less when installing the Units. Not connecting to a ground of 100 Ω or less may result in electric shock.
- Always turn OFF the power supply to the CPU Unit, Slaves, and Communications Units before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock.
  - Mounting or dismounting I/O Units, CPU Units, Memory Packs, or Master Units.
  - Assembling the Units.
  - Setting DIP switches or rotary switches.
  - Connecting cables or wiring the system.

⚠Caution Failure to abide by the following precautions could lead to faulty operation of the SYSMAC SPU Unit or the system, or could damage the SYSMAC SPU Unit. Always heed these precautions.

- Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes.
- Interlock circuits, limit circuits, and similar safety measures in external circuits (i.e., not in the Programmable Controller) must be provided by the customer.
- Always use the power supply voltages specified in the operation manuals. An incorrect voltage may result in malfunction or burning.
- Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction.
- Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in burning.
- Install the PLC away from devices that generate high-frequency noise.
- Disconnect the Power Supply Unit's LG terminal from the GR terminal before conducting an insulation resistance test or withstand voltage test.
- Do not drop the SPU Unit or subject it to excessive vibration or shock.
- Make sure that all the Backplane mounting screws, terminal block screws, and cable connector screws are tightened to the torque specified in the relevant manuals. Incorrect tightening torque may result in malfunction.
- Leave the label attached to the Unit when wiring. Removing the label may result in malfunction if foreign matter enters the Unit.
- Remove the label after the completion of wiring to ensure proper heat dissipation. Leaving the label attached may result in malfunction.
- Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals. Connection of bare stranded wires may result in burning.
- Double-check all wiring and switch settings before turning ON the power supply. Incorrect wiring may result in burning.
- Wire all connections correctly.
- Mount Units only after checking terminal blocks and connectors completely.
- Make sure that the terminal blocks, expansion cables, and other items with locking devices are locked in place.
- When transporting the Unit, use special packing boxes and protect it from being exposed to excessive vibration or impacts during transportation.
- Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in unexpected operation.
- Observe the following precautions when wiring the communications cable.
    - Separate the communications cables from the power lines or high-tension lines.
    - Do not bend the communications cables past their natural bending radius.
    - Do not pull on the communications cables.
    - Do not place heavy objects on top of the communications cables.
    - Always lay communications cable inside ducts.
    - Use appropriate communications cables.

- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up. Not doing so may result in malfunction or damage.
- Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation.
  - Changing the operating mode of the PLC (including the setting of the startup operating mode).
  - Force-setting/force-resetting any bit in memory.
  - Changing the present value of any word or any set value in memory.
  - Touch the Unit only after first touching a grounded metal object to discharge any static electricity from your body.
  - Do not remove the Memory Card while the CARD indicator is lit. Doing so may damage the files on the Memory Card.
  - Do not turn OFF the power supply while Memory Card data is being accessed. Doing so may damage the files on the Memory Card.
  - Maintain the operating environment for the Memory Cards (such as the ambient operating temperature and other conditions). Request operating environment conditions from the manufacture of the card.
  - OMRON is not responsible for the operation of any memory cards produced by other manufacturers.
  - We recommend making a backup of the PC Card or Memory Card to prevent loosing the data inadvertently, e.g., by mistakenly deleting it.
  - Only Memory Cards can be used in the PC Card slot in a CS-series SYSMAC SPU Unit. Modem cards and Ethernet cards, which are not Memory Cards, cannot be used. Do not insert anything but Memory Cards into the Memory Card slot.
  - Make sure that the PC card or Memory Card is in the guides when inserting it. Faulty operation may result if the card is not in the guides.
  - Always lock the Memory Card in place with the card holder or card cover after inserting it. The Memory Card may become disconnected if it is not locked in place, causing faulty operation.
  - Always confirm that the Memory Card is facing the correct direction before inserting it. If a Memory Card is forced into the slot in the wrong direction, the Memory Card or guides may be damaged.
  - Always confirm the command code displayed on the 7-segment display before pressing the **ENTER** Button. Faulty operation may result if the command code is incorrect.
  - Never restart or turn OFF the power to the SYSMAC SPU Unit while changing sampling settings or other settings. “P1,” “P2,” and through “PE” will be displayed on the 7-segment display while sampling settings are being changed. the SYSMAC SPU Unit is restarted or turned OFF before completing the change operation, the system file being changed may be damaged.
  - Do not turn OFF the power supply to the Unit while transferring the Unit parameters or other data. Doing so may result in incorrect data being transferred to the Unit or the Unit may malfunction.
  - With the CJ1W-SPU01 SYSMAC SPU Unit, do not connect anything other than a UPS connection to the COMM port. Doing so may inadvertently shut down the SYSMAC SPU Unit.

6 Conformance to EC Directives

6-1 Applicable Directives

- EMC Directives
- Low Voltage Directive

6-2 Concepts

EMC Directives

OMRON devices that comply with EC Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards (see the following note). Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer.

EMC-related performance of the OMRON devices that comply with EC Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

Note Applicable EMS (Electromagnetic Susceptibility) and EMI (Electromagnetic Interference) Standards in the EMC (Electromagnetic Compatibility) standards are as follows:

Unit	EMS	EMI
CS1W-SPU01	EN61000-6-2	EN61000-6-4 (Radiated emission: 10-m regulations)
CS1W-SPU02		
CJ1W-SPU01		

Low Voltage Directive

Always ensure that devices operating at voltages of 50 to 1,000 V AC and 75 to 1,500 V DC meet the required safety standards for the PLC (EN61131-2).

SECTION 1
Overview of Features and Functions

This section provides an overview of the SPU-Console and describes the operating environment, including computer system requirements.

1-1 Overview of the SYSMAC SPU Unit

The SYSMAC SPU Unit is a CS-series CPU Bus Unit that collects the specified I/O memory data from the CPU Unit using specified collection methods (called collection patterns) and stores the data as CSV-format files (comma-delimited). This function enables the SYSMAC SPU Unit to be used for applications such as analyzing the operation of the PLC and I/O connected to the PLC, recording manufacturing data and other information, and much more.

The SYSMAC SPU Unit has two modes that can be selected to suit the application: Sampling Mode and Data Storage Mode. The SYSMAC SPU Unit's functions are different in these two modes.

- Sampling Mode

  In this mode, the SYSMAC SPU Unit samples the specified I/O memory data from the CPU Unit at regular time intervals. The time intervals are nearly constant, so the data can be recorded at particular times, and more reliable information can be reproduced from the collected data.

- Data Storage Mode

  In this mode, the SYSMAC SPU Unit records the specified I/O memory data from the CPU Unit when a particular event occurs. This mode can record data when a particular bit turns ON or at a particular time. In addition, it is also possible to record data at a fixed time after the event occurs, although the time interval is not as precise as it is in Sampling Mode.

Either of these modes can be selected after the SYSMAC SPU Unit is installed.

The settings and display in SPU-Console SPU Basic Software depend on the operating mode. For this reason, this manual is divided into a Sampling Mode part and a Data Storage Mode part. In this manual, references to Sampling Mode indicates information applicable to Sampling Mode only, and references to Data Storage Mode indicates information applicable to Data Storage Mode only.

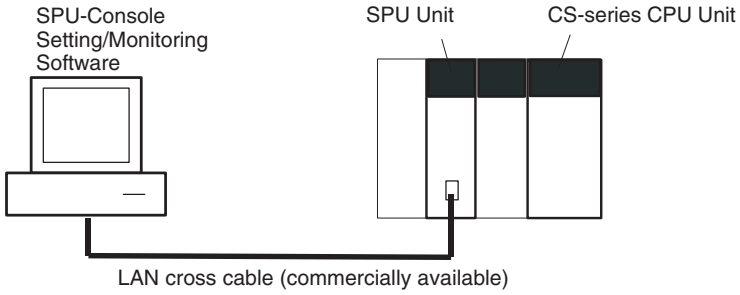
1-2 SPU-Console

The SPU-Console is a software product used for OMRON's Storage and Processing Unit (called the SYSMAC SPU Unit) to set and operate the SYSMAC SPU Unit, monitor operating status/errors, display trend graphs, and perform other operations from a personal computer. The SPU-Console functions are explained next.

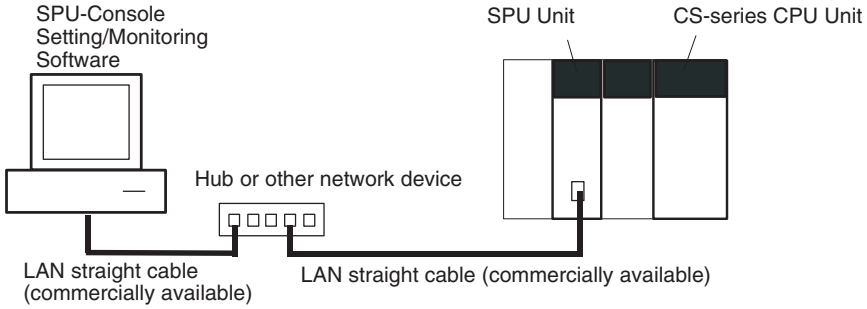
1-2-1 Unit Connections

The SPU-Console is connected to the SYSMAC SPU Unit via a LAN. The SPU-Console dynamically creates windows based on the ID information in the SYSMAC SPU Unit that is connected, eliminating the need to set the model in the software.

1:1 Connection



Network Connection



1-2-2 Unit Settings

SYSMAC SPU Unit settings are performed by setting the time according to the SYSMAC SPU Unit's location (time zone settings), network settings, such as the name and IP address on the Window network, and FINS network settings.

1-2-3 Sampling Settings (Sampling Mode)

The data in I/O memory of the CPU Unit that is to be sampled by the SYSMAC SPU Unit is set in Sampling Mode. Sampling data is specified using variables. Variables have attributes, such as addresses and data types. Scale conversion of variables is also possible. The collection pattern in Sampling Mode is called the sampling pattern. Four sampling patterns (realtime sampling and sampling 1 to 3) are available. For each sampling pattern, the length of the sampling time interval, number of records, name of the file to be saved, and the number of files are specified.

1-2-4 Data Collection Settings (Data Storage Mode)

The data in the CPU Unit memory to be collected by the SYSMAC SPU Unit in Data Storage Mode and the collection method to be used must be specified. Data collection is specified using variables. Variables have attributes, such as addresses and data types. Scale conversion of variables is also possible. The collection method in Data Storage Mode is called the data collection pattern. Two data collection patterns are supported: basic collection for single data, and data collection for multiple data. For each collection pattern, the length of the sampling time interval, number of records, name of the file to be saved, and number of files are specified.

The event settings that specify the time for data collection to start are also set. Events are either memory events, which occur when specific conditions are satisfied by values in memory, and schedule events, which occur at specific times or time intervals. The combination of these events with the processing that is performed when the events occur are called event rules. Event rules such as “data is recorded in a CSV file whenever a certain bit turns ON” or “data is recorded in a CSV file every data at 8:00” can be set.

1-2-5 Scheduler Settings (Data Storage Mode)

In Data Storage Mode, schedule events can be set whereby an event occurs on a specific day and time. These are called scheduler settings. With scheduler settings, events occur at set times such as by hour (e.g., every hour), by day (e.g., every day), by week (e.g., every Monday). The event rules for data collection execution or other rules for event processing can be defined. Working days and the end of the month can also be specified for these events.

1-2-6 Event List (Data Storage Mode)

In Data Storage Mode, a list of the memory events and schedule events set in the SYSMAC SPU Unit can be displayed. The list displays which events are set and the operations that will be executed when these events occur.

1-2-7 Executing SYSMAC SPU Unit Commands

Commands such as those for starting/stopping sampling for the SYSMAC SPU Unit can be executed from the SPU-Console.

1-2-8 Monitoring SYSMAC SPU Unit Operating Status

The SYSMAC SPU Unit operating status and error information can be displayed on the SPU-Console.

1-2-9 Historical Trend Graphs

Data recorded in CSV files by the SYSMAC SPU Unit can be displayed on trend graphs.

1-2-10 Realtime Trend Graphs (Sampling Mode)

Sampling data collected by the SYSMAC SPU Unit can be displayed on trend graphs in realtime.

1-3 System Requirements

The system requirements to use the SPU-Console are described in this section.

1-3-1 SPU-Console Specifications

Item			Specification
Model number			WS02-SPTC1-V1 (SPU-Console Ver. 1.3)
System requirements	Computer hardware		Computer that meets the system requirements for Microsoft Windows XP Professional
	CD-ROM drive		Required for installation.
	Display		Super VGA (800 × 600) or better high-resolution video adapter and monitor
	Mouse		Must conform to the models supported by the applicable OS.
	Network card		A separate Ethernet network card is required for computers that do not have a LAN port.
	OS		Microsoft Windows 2000 Professional Microsoft Windows XP Home Edition Microsoft Windows XP Professional
	Application platform		Microsoft.NET Framework Version 1.1
Communications platform			FinsGateway Version 2003
Functions			Unit information, Unit setup, variable settings, collection pattern settings, event settings, and trend graphs
Unit information		Monitor	SYSMAC SPU Unit operating status and error information are displayed.
		Operation	Operations, such as starting sampling
Unit setup			IP network settings
			FINS network settings
Variable settings			Setting items to sample (by specifying I/O memory addresses using variables)
Collection pattern settings			Collection pattern settings (period, file designations for saving, etc.)
Event settings (in Data Storage Mode)		Memory event settings	Settings for conditions according to changes in memory (e.g., bits turning ON)
		Scheduler settings	Settings for schedules (e.g., specific times, time intervals)
Trend graphs		Historical trends	CSV files are read and displayed.
		Realtime trends	Current sampling data is read and displayed in trend graphics in real time.

Note

1. It is not possible to connect to a SYSMAC SPU Unit with unit version 1.3 from SPU-Console versions lower than 1.3. Use SPU-Console version 1.3 to connect to a SYSMAC SPU Unit with unit version 1.3.
2. It is possible to connect to a SYSMAC SPU Unit with a unit version earlier than 1.3 from SPU-Console version 1.3, but the SPU-Console's operations will be limited to SPU-Console operations for the lower unit version.

1-3-2 Package Contents

The WS02-SPTC1-V1 contains the following software and data.

SPU-Console Execution Program
The program that performs SYSMAC SPU Unit settings and operations.

Microsoft .NET Framework Version 1.1 Redistribution Package
Microsoft .NET Framework Version 1.1 is required to run the SPU-Console. The Microsoft .NET Framework Version 1.1 Redistribution Package provided in the package can be used to install .NET Framework in the computer.

SYSMAC SPU Unit System Data
This system data is transferred to the SYSMAC SPU Unit.

FinsGateway Version 2003
This communications middleware is required to run the SPU-Console.

Manual Data
The manual data includes this manual and the *SYSMAC SPU Unit Operation Manual* (V229) in PDF (portable document format).

SECTION 2
Setting Up, Starting, and Exiting the SPU-Console

This section describes procedures for installing and uninstalling the SPU-Console, SPU-Console starting methods, and the basic SPU-Console window configuration.

2-1 Installation

2-1-1 Preparations for Installation

Before installing the SPU-Console, check the requirements given in *1-3 System Requirements* to be sure that all requirements have been met.

The following basic steps are required to set up the SPU-Console.

1,2,3...

1. Installing Microsoft .NET Framework
2. Installing FinsGateway
3. Installing SPU-Console

2-1-2 Installing Microsoft .NET Framework

Microsoft .NET Framework Version 1.1 is required to run the SPU-Console.

Confirming whether .NET Framework Is Already Installed

Use ***Control Panel - Add or Remove Programs*** on your computer to see if Microsoft .NET Framework Version 1.1 is already installed.

If Microsoft .NET Framework 1.1 is listed in the currently installed programs, then it is already installed and does not need to be installed again.

Installing Microsoft .NET Framework

Microsoft .NET Framework Version 1.1 can be installed from the .NET Framework Redistribution Package included in the SPU-Console installation disk.

Installing the Redistribution Package

1,2,3...

1. Start the computer and log in as a user with administrator rights.
2. Place the SPU-Console installation disk in the CD-ROM drive.

   If the installation program starts automatically, click the **Cancel** Button to exit the program.
3. Execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\Dotnet\English\Dotnetfx.exe

Installing from the Windows Update

Installation is also possible from the Microsoft Windows Update. You must be able to connect to the Internet to use the Windows Update function.

Note The Windows Update is provided by Microsoft Corporation.

For Windows 2000, select ***Start - Windows Update.***

For Windows XP, select ***Start - All Programs - Windows Update.***

2-1-3 Installing FinsGateway

FinsGateway Version 2003 is required to run the SPU-Console.

If a version lower than FinsGateway Version 2003 is already installed, uninstall it first.

The computer must be restarted after installing FinsGateway.

1,2,3...

1. Start the computer and log in as a user with administrator rights.
2. Place the SPU-Console installation disk in the CD-ROM drive.

   If the installation program starts automatically, click the **Cancel** Button to exit the program.
3. Execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\FinsGateway\setup.exe
4. Follow the instructions provided by the installation program.
5. Restart the computer when installation has been completed.

2-1-4 Installing SPU-Console

Use the following procedure to install the SPU-Console.

1,2,3...

1. Start the computer and log in as a user with administrator rights.
2. Place the SPU-Console installation disk in the CD-ROM drive.

   The installation program will start automatically. If it does not start, execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\setup.exe
3. Follow the instructions provided by the installation program.

2-2 Uninstalling SPU-Console

Use the following procedure to uninstall the SPU-Console program and thus delete it from the computer.

2-2-1 Uninstalling SPU-Console

Use the following procedure to uninstall the SPU-Console.

1,2,3...

1. Start the computer and log in as a user with administrator rights.
2. Select ***Start - Control Panel.***
3. Execute ***Add or Remove Programs*** for Windows XP or ***Add/Remove Programs*** for Windows 2000.
4. Select ***OMRON SPU-Console Version 1.3*** from the list of currently installed programs and click the **Remove** Button.

   The Setup Maintenance Program will be started.
5. Select ***Remove*** from the Setup Maintenance Program and then click the **Next** Button.

   Follow the instructions provided by the uninstallation program.

2-2-2 Uninstalling FinsGateway

Do not uninstall FinsGateway if it is being used by an application other than SPU-Console.

The computer must be restarted after uninstalling FinsGateway.

1,2,3...

1. Start the computer and log in as a user with administrator rights.
2. Select ***Start - Control Panel.***
3. Execute ***Add or Remove Programs*** for Windows XP or ***Add/Remove Programs*** for Windows 2000.
4. Select ***OMRON FinsGateway Version 2003*** from the list of currently installed programs and click the **Change/Remove** Button.

   The Setup Maintenance Program will be started.
5. Select ***Remove*** from the Setup Maintenance Program and then click the **Next** Button.

   Follow the instructions provided by the uninstallation program.
6. Restart the computer.
7. Execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\FgwUtils\FgwRemover2003.exe

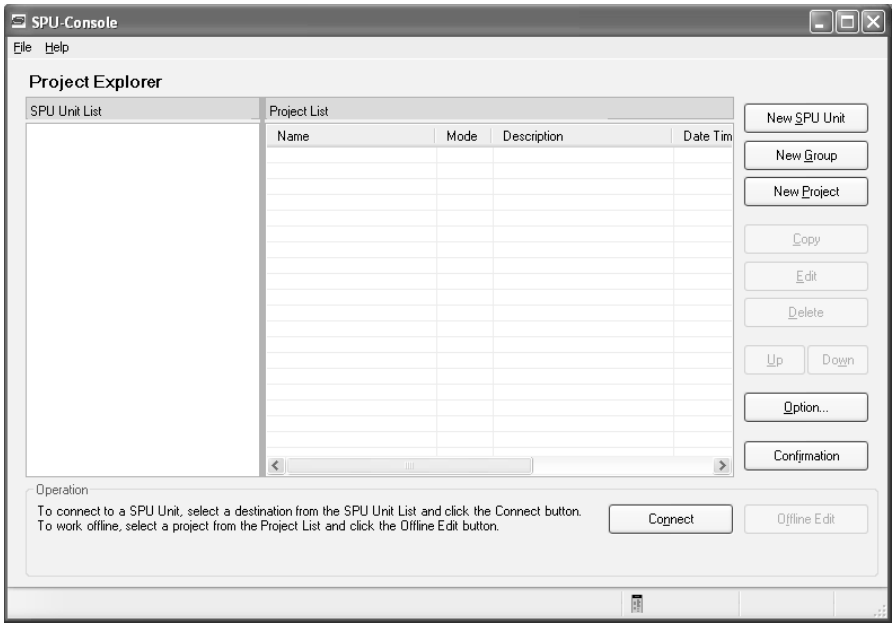
   Follow the instructions provided by the uninstallation program.
8. Restart the computer.

2-3 Starting and Exiting SPU-Console

2-3-1 Starting SPU-Console

Select ***Start - All Program - OMRON - SPU Console 1.3 - SPU Console.***

The SPU-Console will be started and the following window will be displayed.



Note

(1) The user must have administrator rights to run the SPU-Console. Log in as a user that has administrator rights.

(2) More than one copy of SPU-Console can be started at the same time.

(3) If the following message appears when starting the SPU-Console, use the following procedure to reinstall the SPU-Console: “File or assembly name of FgwDotne, or one of its dependencies, was not found.”

- Start the Setup Maintenance Program using the following procedure in *2-2-1 Uninstalling SPU-Console.*
- Select ***Repair*** from the Setup Maintenance Program and then click the **Next** Button.
  Follow the instructions provided by the uninstallation program.

2-3-2 Exiting SPU-Console

Select ***File - Exit*** from the SPU-Console menus.

The SPU-Console will be closed.

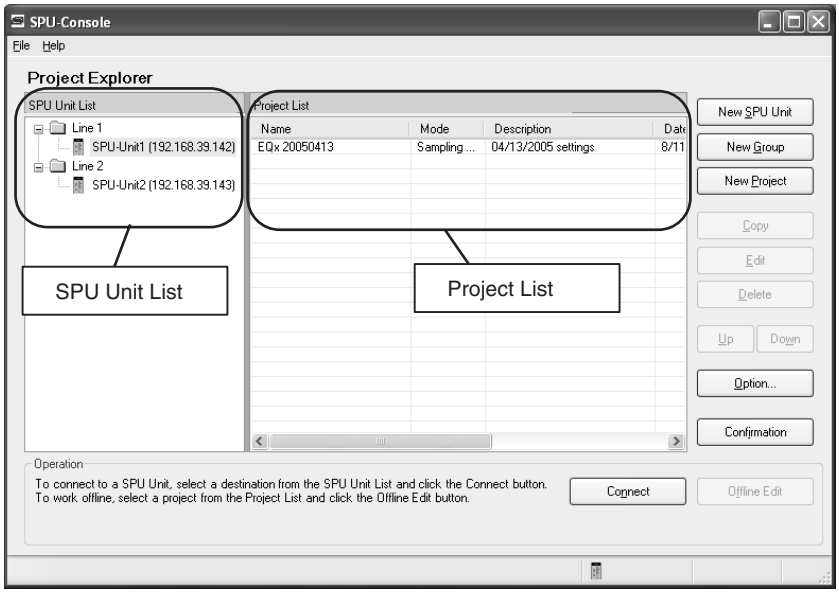
2-4 SPU-Console Window Configuration

The SPU-Console Window consists of several distinct areas. This section describes the various parts that make up the SPU-Console Window.

2-4-1 Project Explorer

The Project Explorer Window is the SPU-Console's startup window.

The SPU Unit List is displayed on the left and the Project List is displayed on the right in SPU-Console version 1.32 or higher. (See note.)

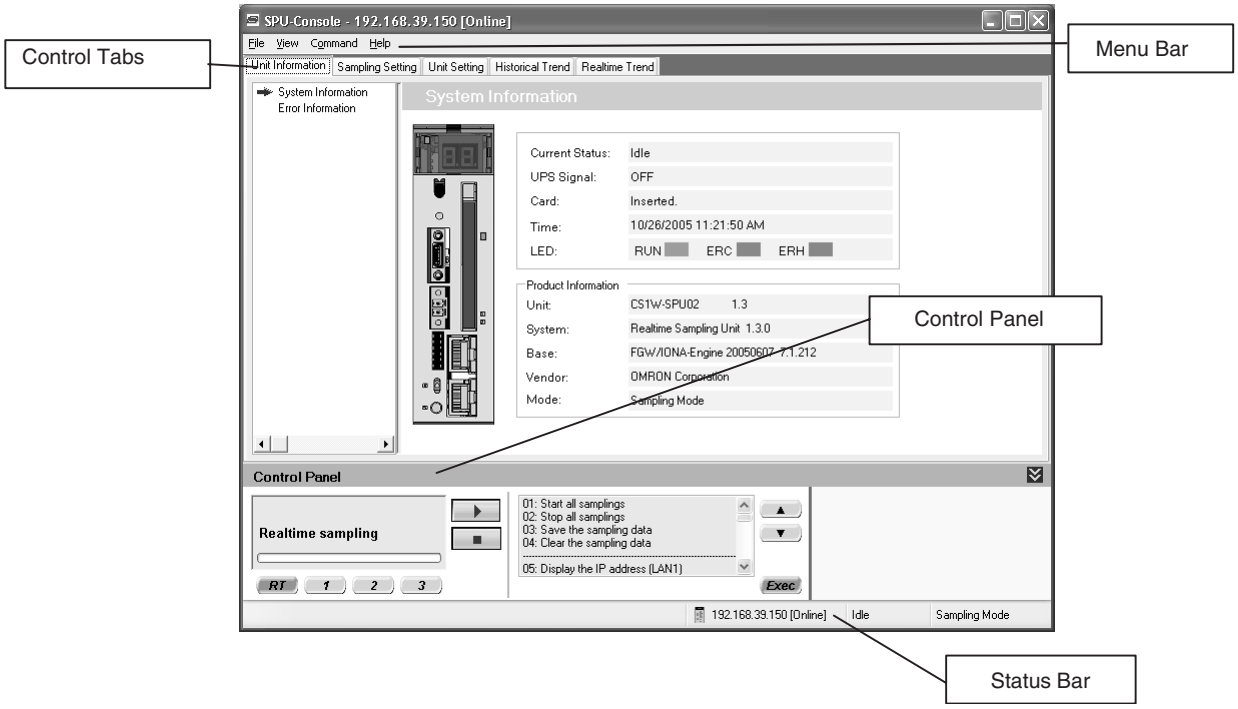


Item	Function
SPU Unit List	Displays a list of the SPU Units (SPU name and IP address) that can be connected. These are the Units that were registered from the Destination Setting Dialog Box.
Project List	Displays a list of SPU Unit settings saved in the computer. (Saved settings include the name, mode, and setting date.)

Note The SPU Unit List on the left is equivalent to the Connection Dialog Box in SPU-Console version 1.31 and lower versions.
The Project List on the right is equivalent to the Offline edit Box in SPU-Console version 1.31 and lower versions.

2-4-2 SPU Unit Online Connection Window

The following window is displayed when the SPU Unit is connected online.



Item	Function
Menu Bar	Provides menus to perform SPU-Console operations. Menu items are grouped into related functions. The name of each group is displayed on the menu bar. The functions within each group are accessed on pull-down menus.
Control Tabs	The control tabs are used to switch between SPU-Console tab pages. The name of each tab page is given on the control tabs. When a tab is clicked, the corresponding tab page will be displayed.
Control Panel	The Control Panel is used to start sampling and execute commands to control SYSMAC SPU Unit operation.
Status Bar	The Status Bar displays information, such as the status of the connected SYSMAC SPU Unit.

SECTION 3
Initial Settings of the SYSMAC SPU Unit

This section describes how to make initial settings for SYSMAC SPU Units.

3-1 Outline of Initial Settings

Initial software settings must be performed to use the SYSMAC SPU Unit. The initial settings include network settings, product information registration, and system data transfer.

The steps require to make the initial settings are as follows:

Connect the SYSMAC SPU Unit and computer with a LAN cable.	3-2
↓	
Start the SYSMAC SPU Unit in Maintenance Mode.	3-3
↓	
Set the IP address of the computer.	3-4
↓	
Make the initial settings for the SYSMAC SPU Unit.	3-5
↓	
Confirm that normal connection is possible from the computer to the SYSMAC SPU Unit on a network.	3-6

Initial settings are performed using the Initialization Wizard from the computer on which the SPU-Console is installed.

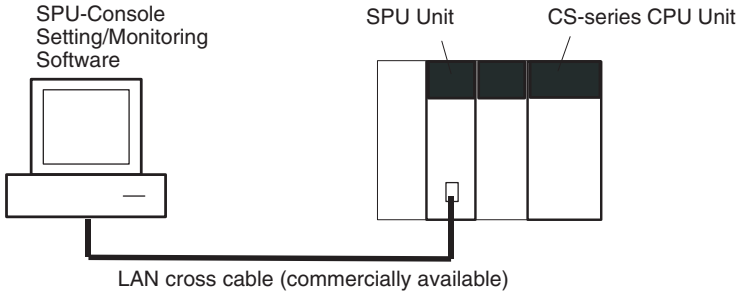
Note The model number and lot number of the SYSMAC SPU Unit are required to make the initial settings for the SYSMAC SPU Unit. Before mounting the SYSMAC SPU Unit, record the information on the sticker on the side of the Unit. The model number and lot number are also printed on the sticker on the package.

3-2 Connecting the SYSMAC SPU Unit and Computer with a LAN Cable

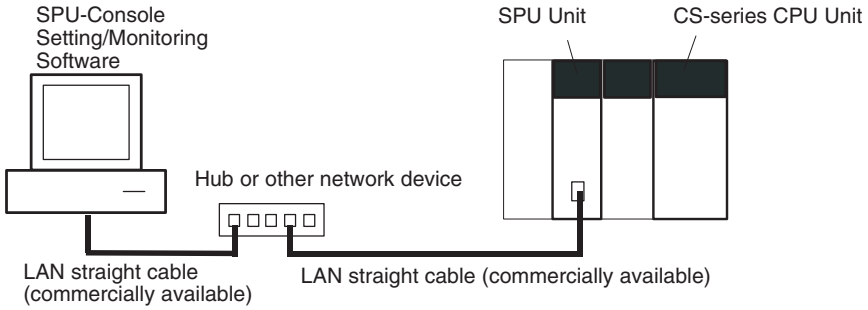
The SYSMAC SPU Unit is connected to the computer with a LAN cable. The connection can be made either through a hub or other network device, or 1:1. A LAN cross-cable is required for a 1:1 connection.

Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.

1:1 Connection



Network Connection



Note Do not connect to the network more than one SYSMAC SPU Unit for which initial settings have not been made. IP addresses will be duplicated, and communications may not be possible. Disconnect the LAN cable from all SYSMAC SPU Units except for one and set one SYSMAC SPU Unit at a time. Alternately, connect each SYSMAC SPU Unit to the computer using a 1:1 connection and set one SYSMAC SPU Unit at a time.

3-3 Starting the SYSMAC SPU Unit in Maintenance Mode

Use the following procedure to start the SYSMAC SPU Unit in Maintenance Mode.

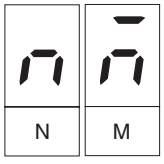
1,2,3...

1. Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.
2. Turn ON pins 4 and 6 on the DIP switch on the SYSMAC SPU Unit and then turn ON the power supply to the PLC. The SYSMAC SPU Unit will start in Maintenance Mode.

   Pin 4 ON = IP address set to 192.168.0.100.

   Pin 6 ON = Start in Maintenance Mode.

   When the SYSMAC SPU Unit has started in Maintenance Mode, “NM” will be displayed on the 7-segment display on the SYSMAC SPU Unit.



3. Check the IP address of the SYSMAC SPU Unit using the following procedure.
   - Press the **SELECT** Switch to select command 05 and then press the **ENTER** Button twice. The IP address will be displayed on the 7-segment display.
   - Confirm that 192.168.0.100 is displayed as the IP address.
   - If the IP address is not 192.168.0.100, check the DIP switch setting and repeat the procedure from step 2.

3-4 Setting the IP Address of the Computer

To enable connecting to the SYSMAC SPU Unit in Maintenance Mode, the IP address of the computer must be temporarily set to 192.168.0.200.

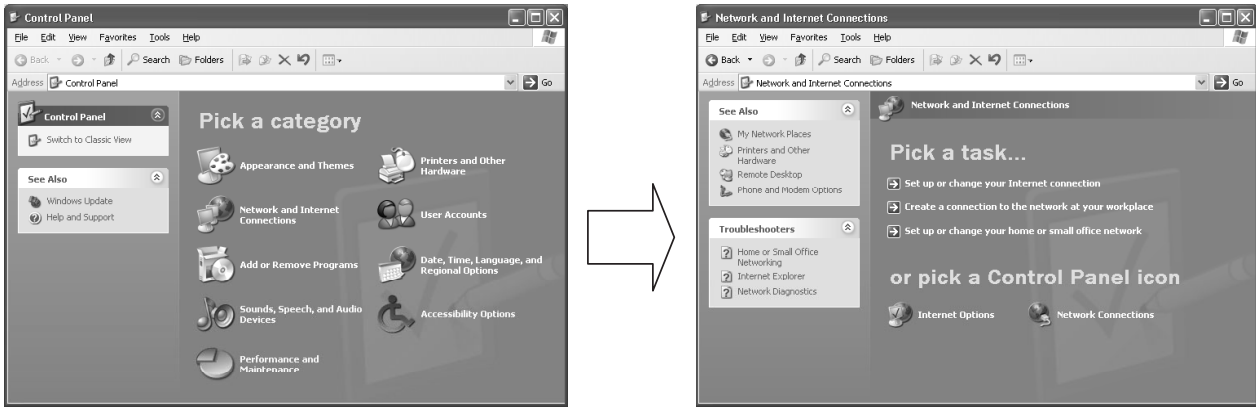
The method for setting the IP address depends on the operating system of the computer. Refer to user documentation provided with your computer for details.

The following procedure is for Windows XP Professional.

1,2,3...

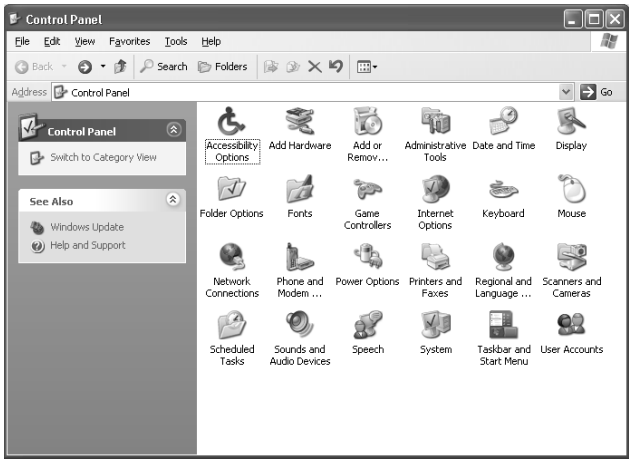
1. Connect the LAN cable to the LAN port on the computer and turn ON the power supply to the computer.
2. Log in using the account of the computer administrator.

   For Windows 2000, log in with administrator rights.
3. Select ***Start - Control Panel.***
4. Click ***Network and Internet Connections*** and then click ***Network Connections.***

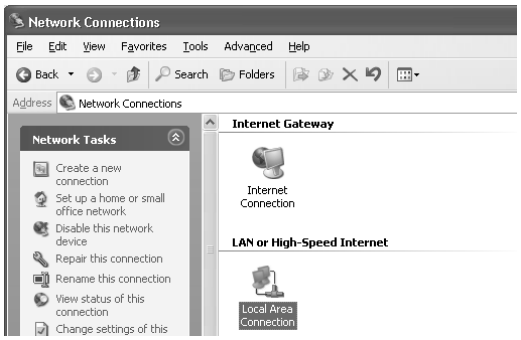


If the control panel is set for classic display, click ***Network Connections*** from the Control Panel.

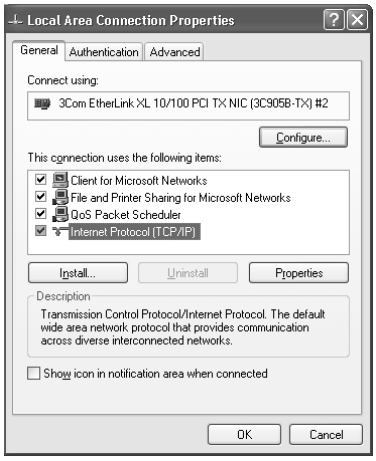
For Windows 2000, click ***Network and Dial-up Connections*** from the control panel.



5. Right-click the network to be set and select ***Properties*** from the menu, as shown below.



The Local Area Connection Properties Dialog Box of the network that was selected will be displayed.



6. Select ***Internet Protocol (TCP/IP)*** and then click the **Properties** Button.

   The Internet Protocol (TCP/IP) Properties Dialog Box shown below will be displayed.

7. Recording the Current IP Address

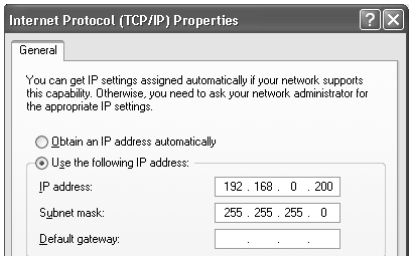
   If *Use the following address* is set, record the current IP address of the computer so that it can be set again later.

IP address	. . .
Subnet mask	. . .
Default gateway	. . .

8. Temporarily Changing the IP Address

   Select ***Use the following address*** and change the IP address to the values given below.

   - IP address = 192.168.0.200
   - Subnet mask = 255.255.255.0



9. Click the **OK** Button to change the setting

   It may be necessary to restart the computer to make the new settings valid.

This completes setting the IP address of the computer.

3-5 Making the Initial Settings for the SYSMAC SPU Unit

The Initialization Wizard of the SPU-Console is used to make the initial settings for the SYSMAC SPU Unit. The Initialization Wizard makes network settings, such as the IP address, transfers system data, etc.

Note If initial settings (initialization) is performed for the SYSMAC SPU Unit, all settings, including the sampling settings and unit settings, will be initialized. Confirm that it is okay to initialize the SYSMAC SPU Unit before proceeding.

1,2,3... 1. Select ***Start - All Program - OMRON - SPU Console 1.3 - Initialization Wizard.***

The Initialization Wizard will be started.

2. Inputting SYSMAC SPU Unit Product Information

Input the model number and lot number of the SYSMAC SPU Unit and click the **Next** Button.

The model number and lot number can be found on the sticker on the side of the SYSMAC SPU Unit or on the sticker on the package.

3. Network Settings

The following items are set.

Item	Setting
Unit Name	This is the name displayed under My Networks on the Windows computer. Set a unique name for each SYSMAC SPU Unit connected to the same network.
Obtain an IP address automatically	Select this setting to automatically obtain an IP address using the DHCP (Dynamic Host Configuration Protocol). **Note** A DHCP server must exist on the network/system to use this setting. If you do not know if a DHCP server exists, ask your system administrator.
Use the following IP address	Select this setting when not automatically obtaining an IP address using the DHCP and then set the IP address and subnet mask.
IP address	Input the IP address. Set a unique IP address for each SYSMAC SPU Unit connected to the same network.
Subnet mask	Set the same subnet mask as the one set on the network computer to be connected.

Set all of the required items and then click the **Next** Button.

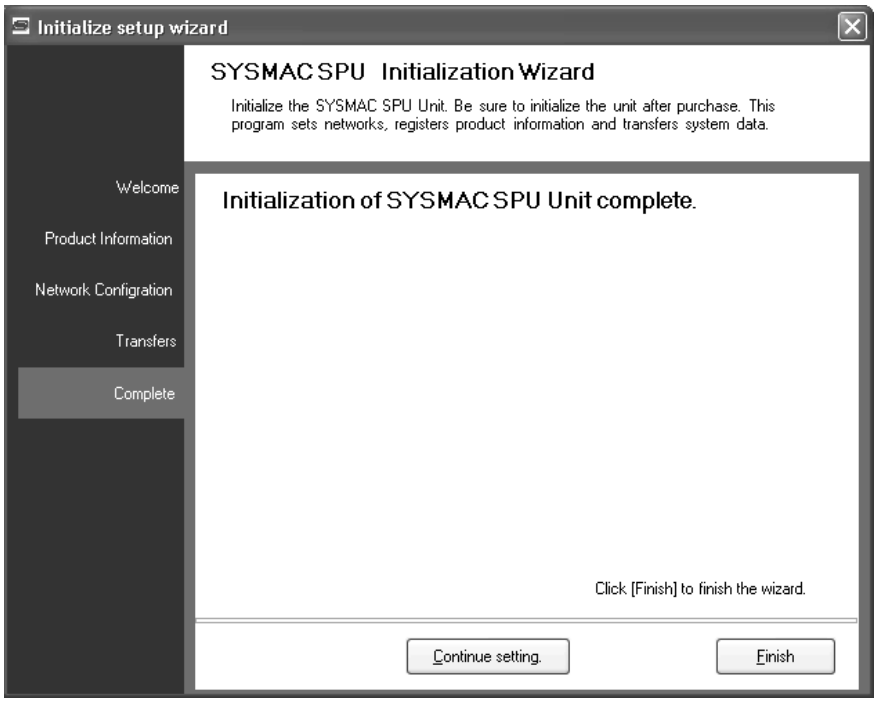
4. Transferring System Data

Check that the settings are correct and then click the **Execute** Button.

System data will be transferred to the SYSMAC SPU Unit.

5. Exiting the Initialization Wizard

   The following window will be displayed if the Wizard is exited normally.



   Click the **Finish** Button to exit.

3-6 Confirming Connections

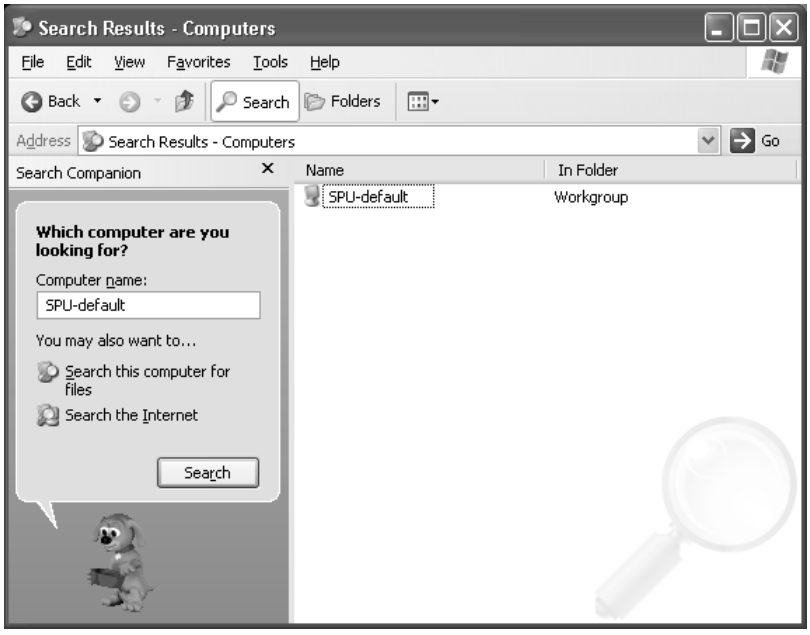
After making the initial settings, use the following procedure to confirm that the SYSMAC SPU Unit on the network can be recognized from the computer.

1,2,3...

1. Return the computer's network settings to their previous values using the procedure in *3-4 Setting the IP Address of the Computer* as a guide.
2. Turn OFF the power supply to the PLC and then turn OFF all pins on the DIP switch on the SYSMAC SPU Unit.
3. Turn ON the power supply to the PLC to start the SYSMAC SPU Unit.
4. Search for SYSMAC SPU Units on the network using the Windows Search for Computers command.
   - For Windows XP, right-click ***My Network Places*** on the **Start** Menu and then select ***Search for Computers.***
   - For Windows XP, right-click ***My Network Places*** on the desktop and then select ***Search for Computers.***

5. Input the Unit Name or IP address for the *Computer name* and then click the **Search** Button.

   The following display will appear if the SYSMAC SPU Unit is found.



SECTION 4
Changing the SYSMAC SPU Unit's Operating Mode

This section provides information on the SYSMAC SPU Unit's operating modes, including procedures for confirming and changing the operating mode.

4-1 Operation Overview

The SYSMAC SPU Unit provides two operating modes: Sampling Mode and Data Storage Mode. For an overview of operating modes, refer to *SECTION 1 Overview of Features and Functions*. Either of these operating modes can be selected.

To select an operating mode, stop all SYSMAC SPU Unit operations. The operating mode cannot be changed while the SYSMAC SPU Unit is operating. Use the following procedure to change the SYSMAC SPU Unit operating mode.

1,2,3...

1. Change the DIP switch setting on the SYSMAC SPU Unit and restart using the restart command.
2. After restarting, execute the command to change the operating mode.
3. When the command to change the operating mode has completed executing, change the DIP switch setting on the SYSMAC SPU Unit and restart the Unit. The SYSMAC SPU Unit will use the newly set operating mode.

4-2 Confirming the Operating Mode

The following three methods can be used to confirm the operating mode.

Using 7-segment display on Front of the SYSMAC SPU Unit

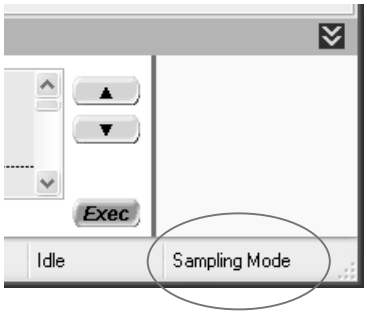
The operating mode is displayed on the 7-segment display on the front of the SYSMAC SPU Unit.

7-segment display	Operating mode
	Sampling Mode
	Data Storage Mode

Using SPU-Console Status Bar

1,2,3...

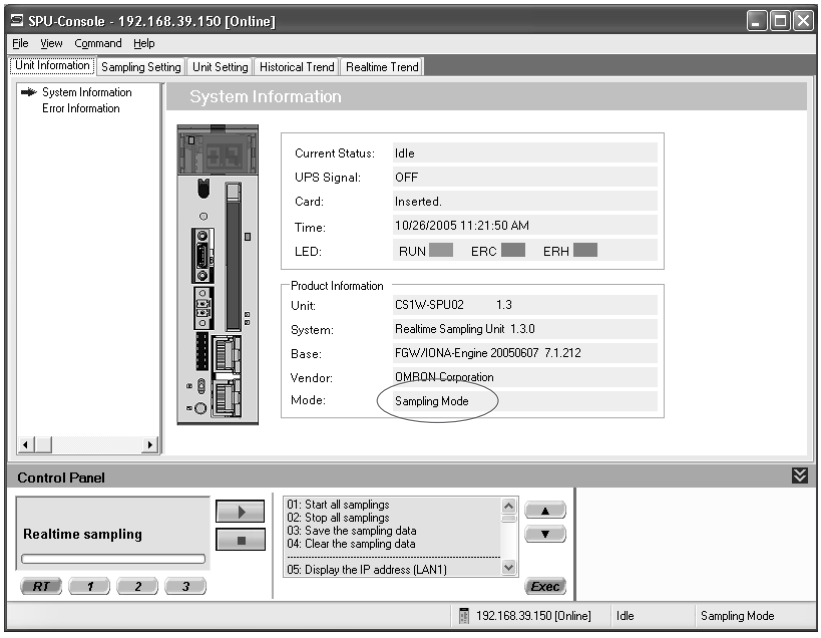
1. Connect to the SYSMAC SPU Unit using the SPU-Console. For details on connection methods, refer to *1-2-1 Unit Connections*.
2. The operating mode is displayed in the Status Bar at the bottom right of SPU-Console.



Using SPU-Console: *Unit Information - System Information - Mode*

1,2,3...

1. Connect to the SYSMAC SPU Unit using the SPU-Console. For details on connection methods, refer to *1-2-1 Unit Connections*.
2. Select the **Unit Information** Tab and ***System Information*** to display the system information.
3. The operating mode is displayed in the *Mode* Field in the System Information Window.

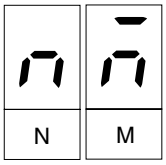


4-3 Changing the Operating Mode

Use the following procedure to change from Sampling Mode to Data Storage Mode.

1,2,3...

1. First, record the SYSMAC SPU Unit's currently set DIP switch setting.
2. Turn ON pins 4 and 6 only of the SYSMAC SPU Unit's DIP switch.
3. Select command 12 (Restart Unit) using the **SELECT** Switch, and then press the **ENTER** Button. For details on command execution methods, refer to *6-3 Executing Commands from the SYSMAC SPU Unit*. The Unit will restart. Check that "NM" is shown on the 7-segment display.



4. Change the SYSMAC SPU Unit's operating mode. Select the number of the operating mode to be changed to using the **SELECT** Switch, and then press the **ENTER** Button.

Operating mode change operation	Number to select using the SELECT Switch
Changing to Sampling Mode	68
Changing to Data Storage Mode	53

5. The display will change from "M1" in order. Wait until "F" is displayed.
6. When "F" is displayed in the 7-segment display, return the DIP switch to the status recorded in step 1.
7. Select command 12 (Restart Unit) using the **SELECT** Switch and press the **ENTER** Button. The SYSMAC SPU Unit will restart and operate in the newly set operating mode.
8. Check that the operating mode has changed. Refer to the confirmation methods in *4-2 Confirming the Operating Mode*.

SECTION 5
Connecting to an SYSMAC SPU Unit

This section provides information on connecting the SPU-Console to SYSMAC SPU Units, managing SYSMAC SPU Unit connections, editing settings offline, transferring setting files between the SPU-Console and SYSMAC SPU Units, and recording files.

5-1 Connecting and Disconnecting

This section describes how to connect/disconnect the SPU-Console to/from SYSMAC SPU Units.

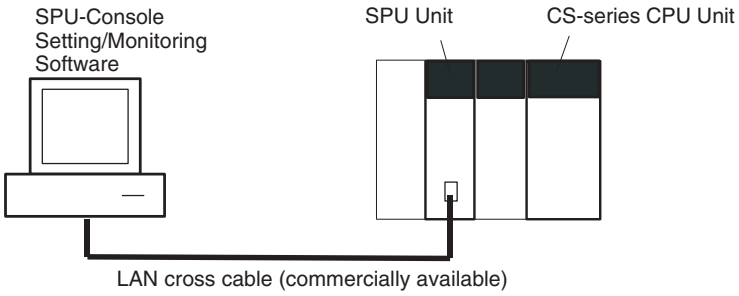
5-1-1 Connecting the SYSMAC SPU Unit and Computer with a LAN Cable

The SYSMAC SPU Unit is connected to the computer with a LAN cable.

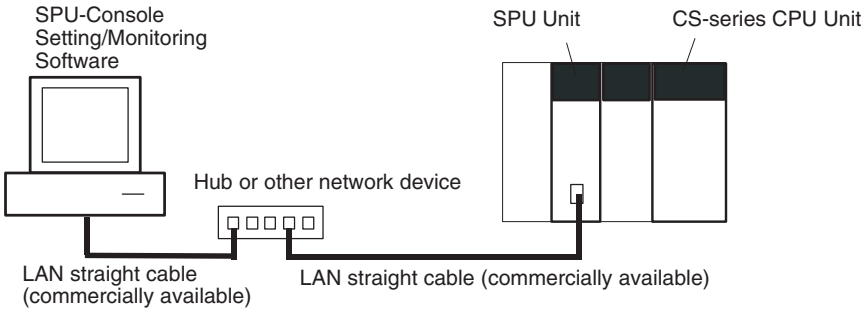
The connection can be made either through a hub or other network device, or 1:1. A LAN cross-cable is required for a 1:1 connection.

Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.

1:1 Connection



Network Connection

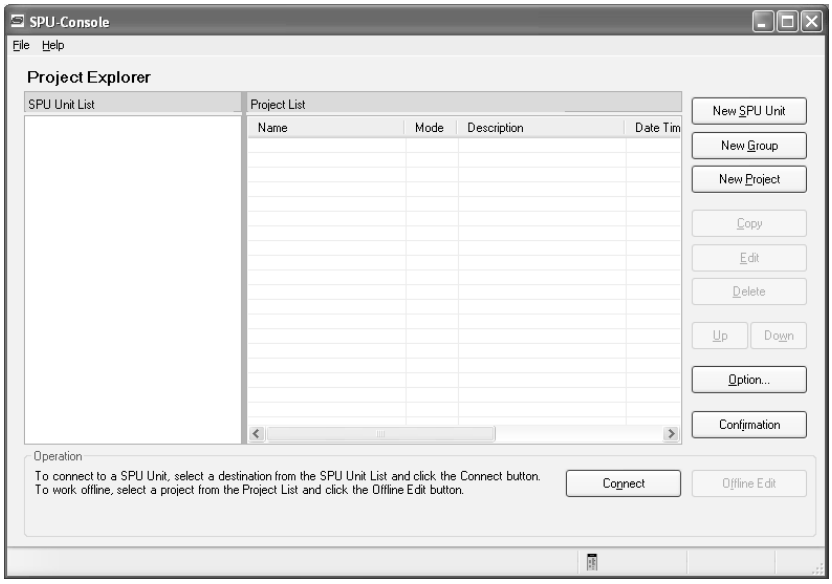


Note Do not connect to the network more than one SYSMAC SPU Unit for which initial settings have not been made. IP addresses will be duplicated, and communications may not be possible. Disconnect the LAN cable from all SYSMAC SPU Units except for one and set one Unit at a time. Alternately, connect each SYSMAC SPU Unit to the computer using a 1:1 connection and set one SYSMAC SPU Unit at a time.
Initial settings for the SYSMAC SPU Unit are made using the Initialization Wizard. Refer to *SECTION 3 Initial Settings of the SYSMAC SPU Unit.*

5-1-2 Connecting to the SYSMAC SPU Unit

1,2,3... 1. Start the SPU-Console.

The Project Explorer Window will be displayed, as shown below.



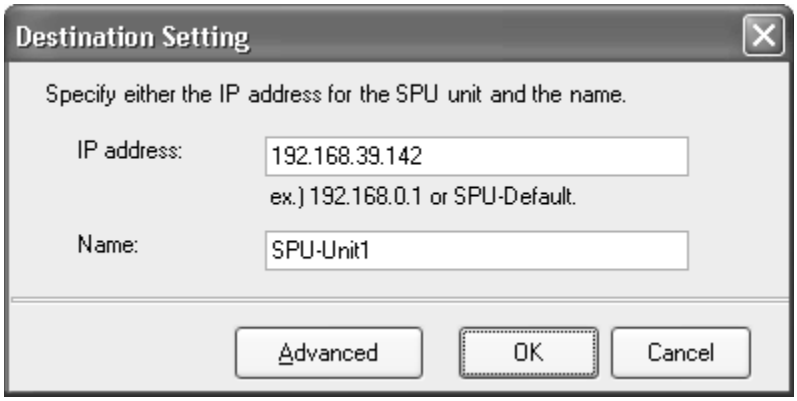
The SPU Unit List is displayed on the left and the Project List is displayed on the right (with SPU-Console version 1.32 or higher).

2. Click the **New SPU Unit** Button.

The Destination Setting Dialog Box will be displayed.

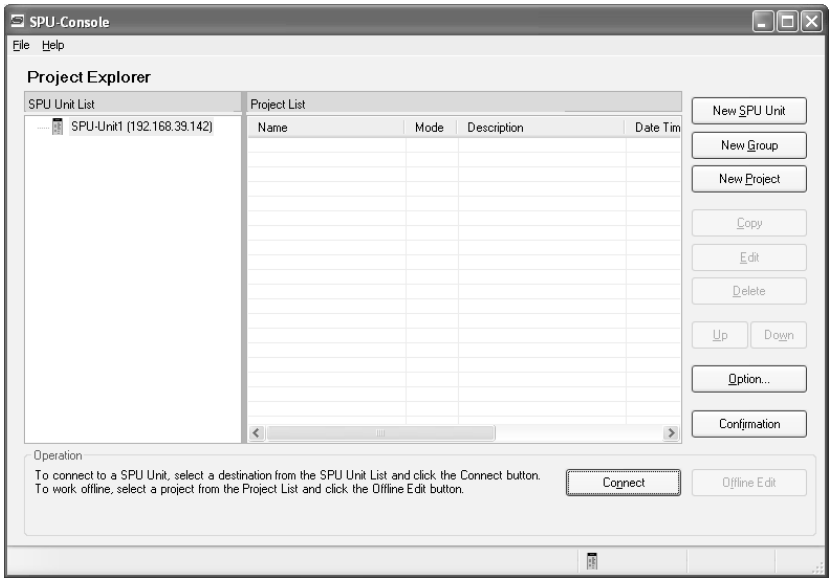
3. For the *IP Address*, specify the IP address of the SYSMAC SPU Unit to which to connect.

Specify a text string that identifies the SYSMAC SPU Unit in the *Description* Field.



4. Click the **OK** Button to register the SPU Unit.

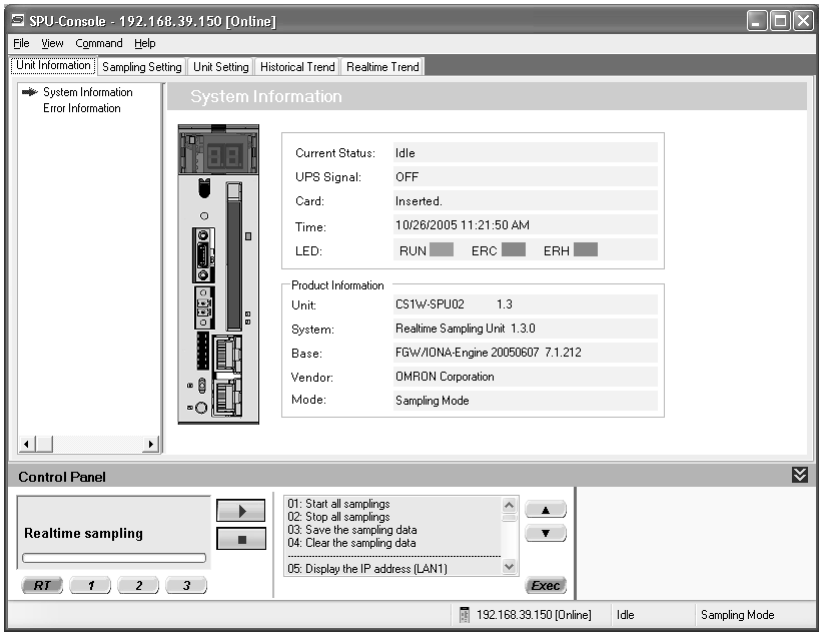
   The registered Unit information will be displayed in the SPU Unit List on the left side of the window, as shown in the following diagram.



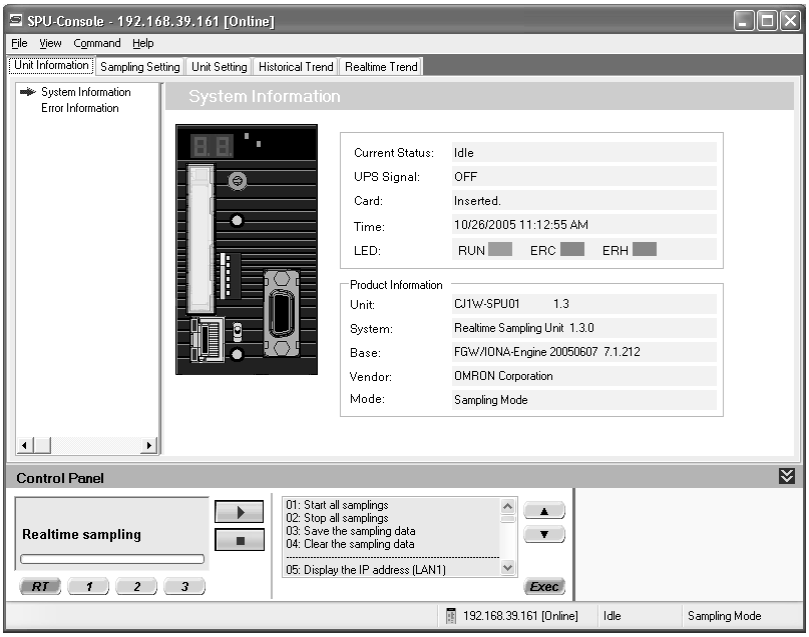
5. Select the SYSMAC SPU Unit to which to connect from the *SYSMAC SPU Unit list* and click the **Connect** Button.

   The following window will be displayed when the connection is made.

CS-series SYSMAC SPU Units

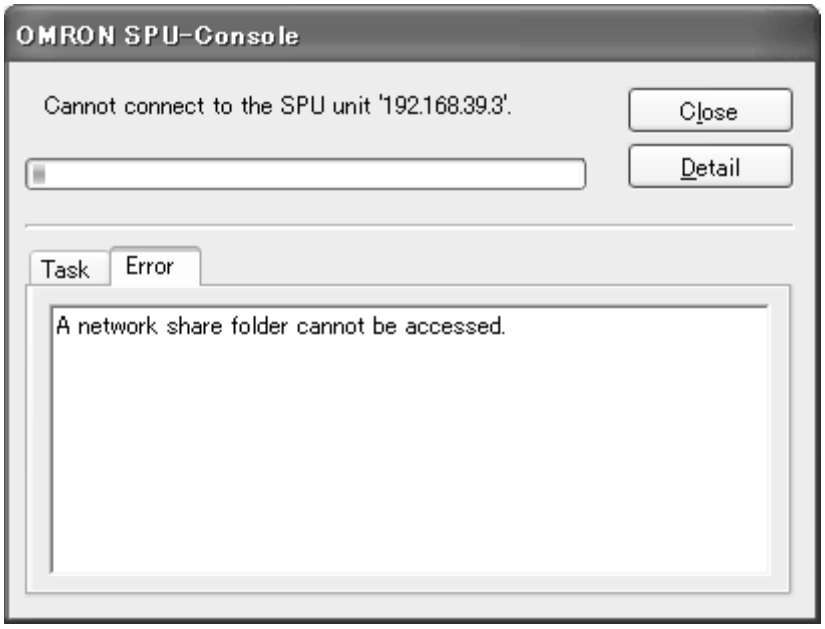


CJ-series SYSMAC SPU Units



5-1-3 Checking the Connection

To check whether it is possible to connect to an SYSMAC SPU Unit, select the Unit from the list of SYSMAC SPU Units in the Connection Dialog Box and then click *Confirmation*. If it is not possible to connect, the contents of the error will be displayed. For details, refer to *Appendix B Troubleshooting Connections*.



5-1-4 Disconnecting

Select ***File - Disconnect.***

The connection to the SYSMAC SPU Unit will be broken.

5-2 Managing Connections

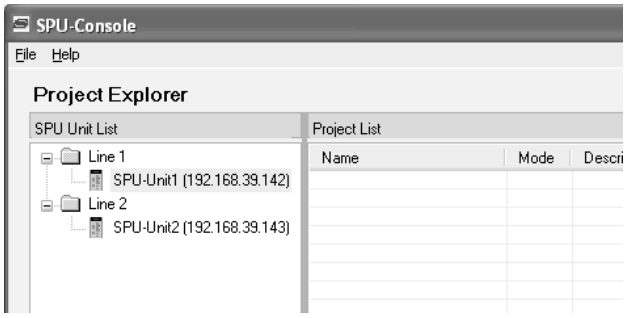
This section describes how to manage connections from the SPU-Console to multiple SYSMAC SPU Units.

5-2-1 Changing and Deleting SYSMAC SPU Unit Registrations

- To change a SYSMAC SPU Unit's registered information, select that SPU Unit from the Project Explorer's SPU Unit List and click the **Change** Button.
- To delete a SYSMAC SPU Unit, select that SPU Unit from the Project Explorer's SPU Unit List and click the **Delete** Button.

5-2-2 Managing SYSMAC SPU Units by Group

As shown in the following window, SYSMAC SPU Units can be managed in groups.



- To create a group, click the **New Group** Button.
- To delete a group, select the group to delete from the *SYSMAC SPU Unit list* and click the **Delete** Button. If a group is deleted, all the SYSMAC SPU Units registered in the group will also be deleted.
- To change a group name, select the group from the *SYSMAC SPU Unit list* and click the **Change** Button.

5-2-3 Moving SYSMAC SPU Unit Registrations

Select the Unit in the SPU Unit List and click the **Up** and **Down** Buttons.

To move a Unit to a different group, select that Unit in the SPU Unit List and drag and drop it in the destination group.

5-2-4 Copying a Unit's Registration

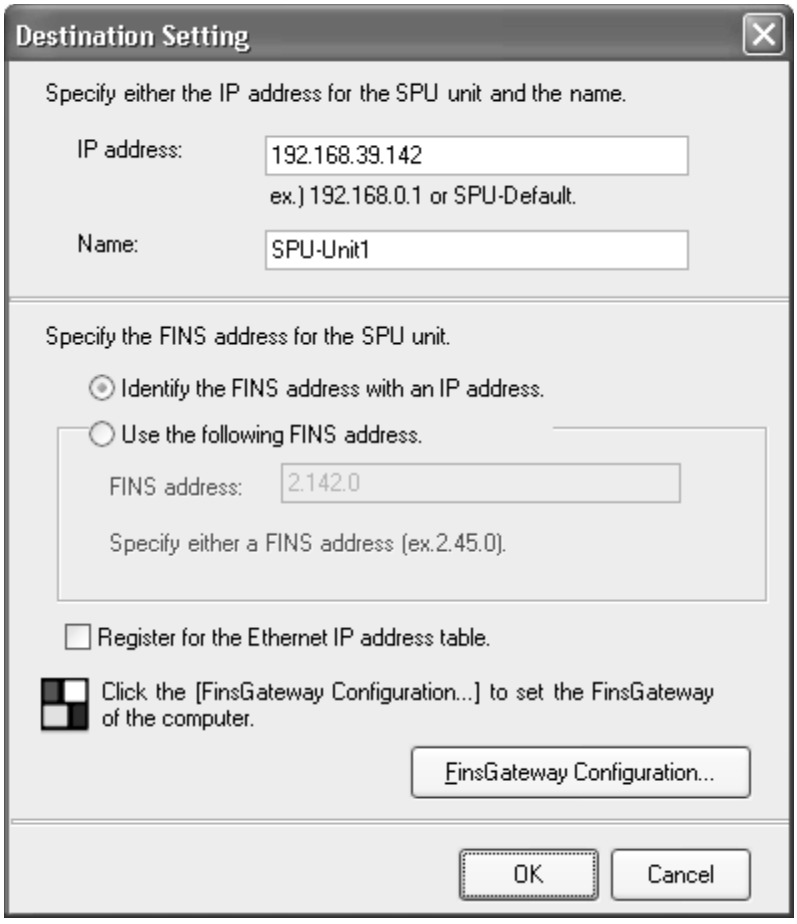
Select the Unit in the SPU Unit List and click the **Copy** Button.

To copy a Unit to a different group, select that Unit in the SPU Unit List, press and hold the **Ctrl** Key, and drag and drop it in the destination group.

5-2-5 Advanced Settings

The SPU-Console can communicate with SYSMAC SPU Units using the Fins-Gateway ETN_UNIT service. The FINS address of an SYSMAC SPU Unit is set in the advanced settings.

To make advanced settings, click the **Advanced** Button from the Destination Setting Dialog Box. Knowledge of FinsGateway and FINS is required to make advanced settings.



Identify the FINS Address with an IP Address

This method is normally selected.

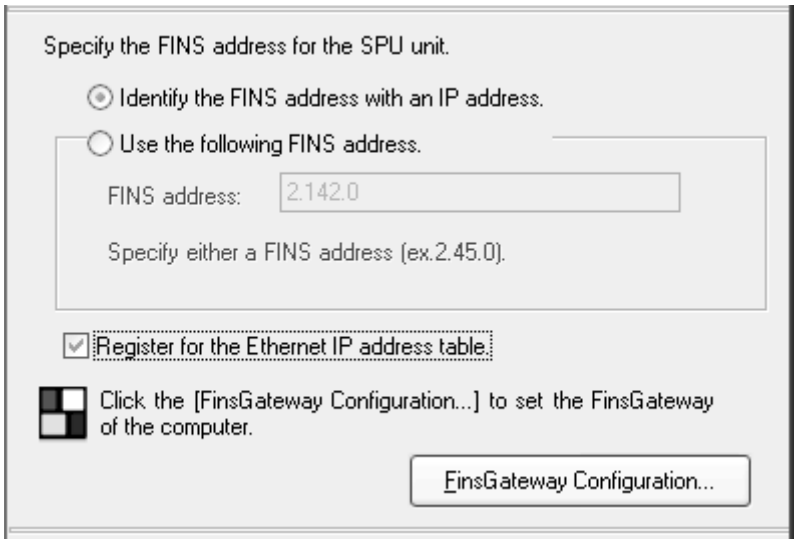
For it, the rightmost byte of the host ID of the IP address is used as the FINS node address.

FINS-IP Conversion for the FinsGateway ETN_UNIT service is set to either *Automatic Generation* or *IP Table + Automatic Generation.*

Use the Following FINS Address

This method is used to specify the FINS node address of an SYSMAC SPU Unit.

Specify the FINS node address in the *FINS address* Field. *FINS-IP Conversion* for the FinsGateway ETN_UNIT service is set to either *IP Address Table* or *IP Table + Automatic Generation.*



Register for the Ethernet IP Address Table

If *Register for the Ethernet IP address table* is selected, the IP address and FINS node address will be registered in the FinsGateway IP address table when connecting to an SYSMAC SPU Unit.

To change FinsGateway settings on the computer, click the **FinsGateway Configuration** Button.

5-2-6 Importing and Exporting Destination SYSMAC SPU Unit Registration

Exporting

Use the following procedure to export the registered contents of the destination SYSMAC SPU Unit to a file.

1,2,3...

1. In the SPU-Console, select ***Export*** from the File Menu.
2. In the Export Dialog Box, enter the file name where indicated.
3. Click the **Save** Button.

Importing

Use the following procedure to import the registered contents for the destination SYSMAC SPU Unit from a file.

1,2,3...

1. In the SPU-Console, select ***Import*** from the File Menu.
2. In the Import Dialog Box, find the file to be imported and click on the file.
3. Click the **Open** Button.

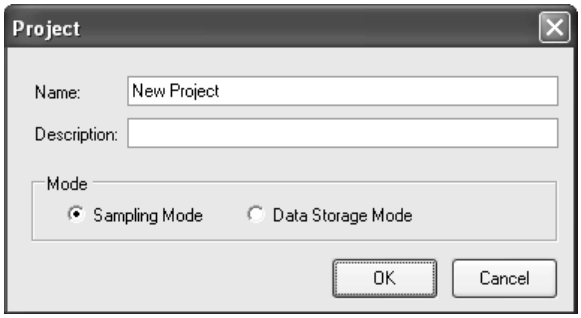
5-3 Editing Settings Offline (Unconnected)

The SPU-Console can be used to edit settings without being connected to the SYSMAC SPU Unit. This operation is called offline editing. Settings edited using offline editing can be saved in the personal computer and transferred to the SYSMAC SPU Unit when the SYSMAC SPU Unit is connected to the personal computer.

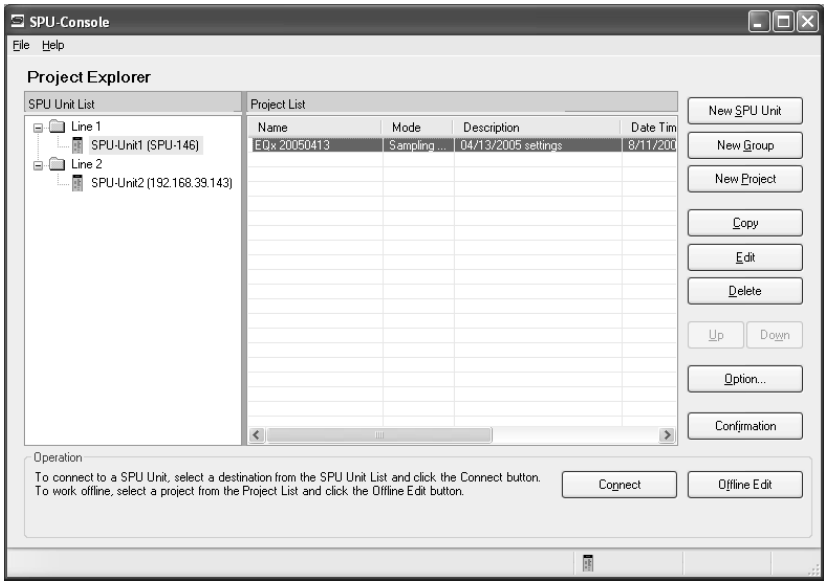
5-3-1 Starting Offline Editing

1,2,3...

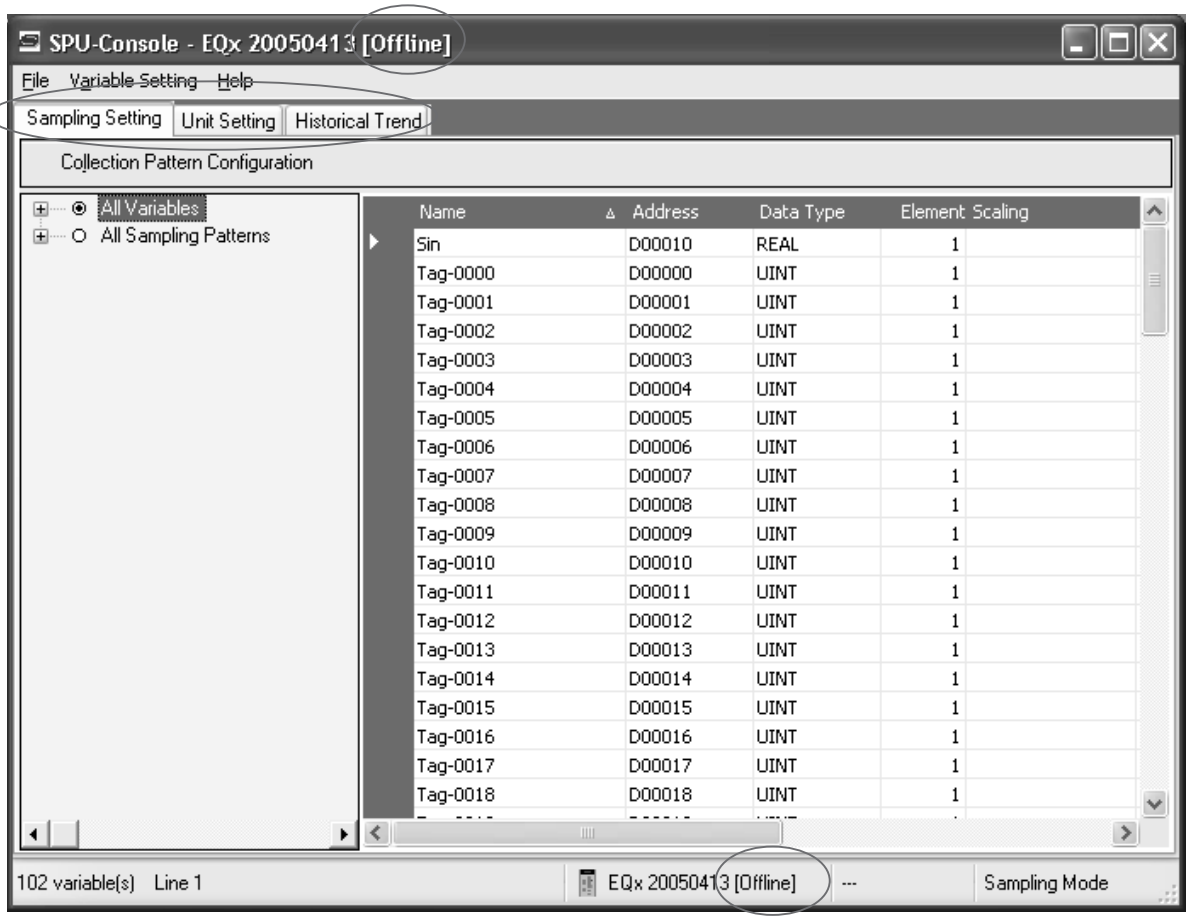
1. Start the SPU-Console.
2. Select the SPU Unit in the SPU Unit List and click the **New Project** Button.
3. Enter the project name and a description in the Project Dialog Box and select the mode. SPU Unit settings will be stored in the project.



4. Click the **OK** Button.
   The project that was created will be added to the Project List, as shown below.



5. Select the project (SPU Unit settings) in the Project List and click the **Offline edit** Button.
6. The tab page of settings that can be edited offline will be displayed. At this point, "Offline" will be displayed in the Title Bar and Status Bar. The displayed tab page depends on the operating mode when the data was saved.



7. Edit the settings in the Sampling Setting Tab Page and Collection Setting Tab Page.

5-3-2 Saving and Ending Offline Editing

1,2,3...

1. Select ***Offline Save As*** or ***Offline Save*** from the File Menu to save data edited offline. The edited data will be saved to the personal computer.
2. Select ***Offline Close*** to end offline editing. The saved settings can be transferred to the SYSMAC SPU Unit after the SYSMAC SPU Unit is connected using the method described next in *5-4 Saving and Transferring Settings*.

5-3-3 Changing or Deleting a Project (SPU Unit Settings)

- To change a project's name or description, select that project in the Project Explorer's Project List and click the **Change** Button.
- To delete a project, select that project in the Project Explorer's Project List and click the **Delete** Button.

5-3-4 Copying or Moving a Project (SPU Unit Settings)

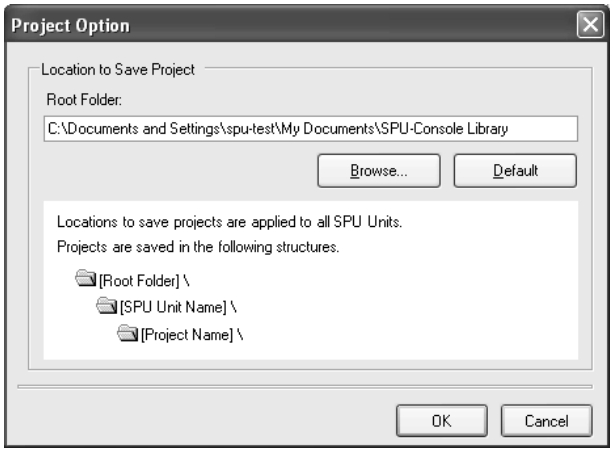
- To copy a project, select that project in the Project List and click the **Copy** Button.
- To copy a project to a different SPU, select that project in the Project List and drag and drop it at the destination SPU Unit.

- To move a project to a different SPU, select that project in the Project List, press and hold the Shift Key, and drag and drop it at the destination SPU Unit.

5-3-5 Changing the Location to Save Project (SPU Unit Settings)

By default, the project is saved in the *\My Documents\SPU-Console Library* folder and displayed in the Project List.

To change to location where the project will be saved, click the **Option** Button in the Project Explorer Window.



5-4 Saving and Transferring Settings

5-4-1 Transferring Settings from the SYSMAC SPU Unit to the Personal Computer

The SPU-Console automatically reads Unit settings when the SYSMAC SPU Unit is connected. Therefore, transferring settings to the personal computer is not normally required. Use the following procedure to transfer settings explicitly from the SYSMAC SPU Unit to the personal computer.

1,2,3...

1. First connect the SPU-Console to the relevant SYSMAC SPU Unit to transfer the current SYSMAC SPU Unit settings to the personal computer.
2. In the SPU-Console, select ***From Unit*** from the File Menu.

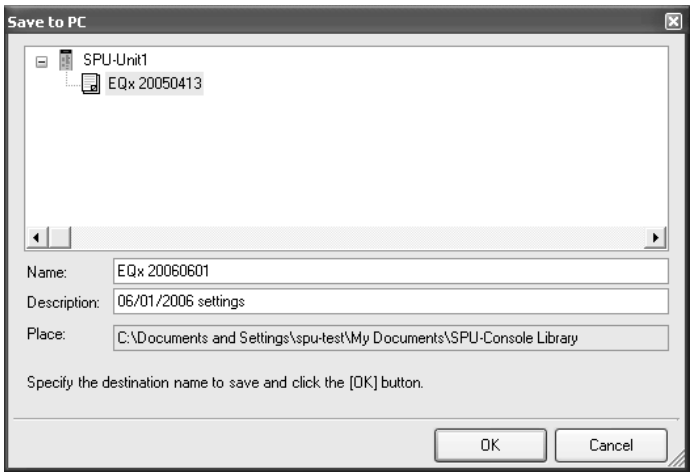
5-4-2 Saving a Project (SPU Unit Settings) to the Computer

The settings created using the SPU-Console or the settings read from the SYSMAC SPU Unit can be saved to the personal computer. The saved settings can also be used in offline editing.

1,2,3...

1. In the SPU-Console, select ***Save to PC*** from the File Menu.

2. In the Save to PC Dialog Box, enter the name and description of the settings to be saved.

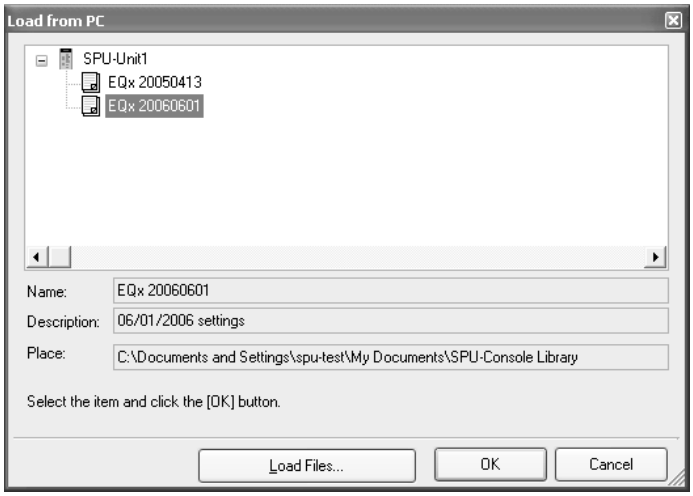


3. Click the **OK** Button to save the settings. Click the **Browse** Button to change the location for saving the settings.

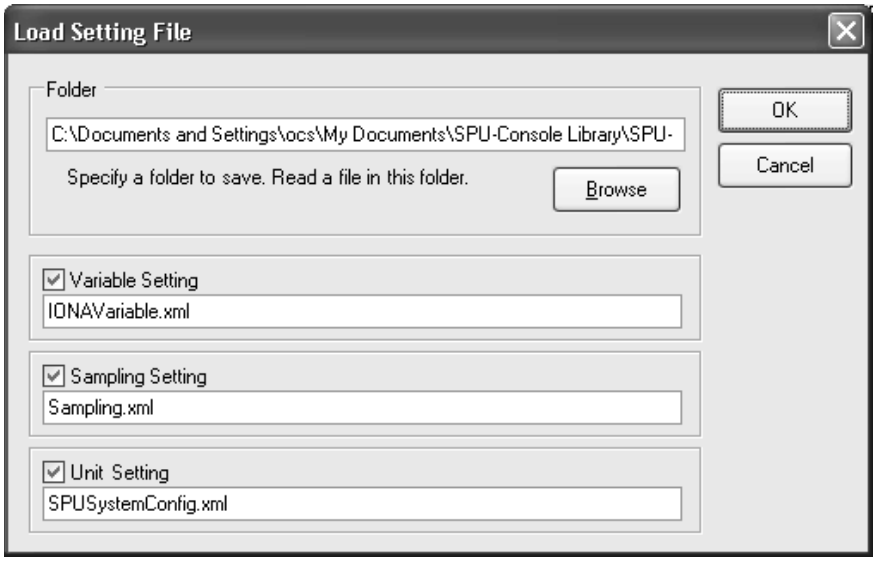
5-4-3 Reading a Project (SPU Unit Settings) from the Computer

SYSMAC SPU Unit settings saved in the personal computer can be read from the SPU-Console. Settings performed using offline editing can be read to the SPU-Console using a similar procedure.

1,2,3... 1. In the SPU-Console, select ***Load from PC*** from the File Menu.



2. In the Load from PC Dialog Box, select the settings to be read and click the **OK** Button.
3. Click the **Load Files...** Button in the Load from PC Dialog Box to display the Load Setting File Dialog Box and select the settings to be read.
   For example, to use settings that have already been saved as collection settings without setting the IP address in the current SYSMAC SPU Unit at the time of saving, deselect ***Unit Setting***.



5-4-4 Transferring Settings from the Personal Computer to the SYSMAC SPU Unit

Use the following procedure to transfer settings edited on the personal computer to the SYSMAC SPU Unit.

1,2,3...

1. Connect the SPU-Console to the SYSMAC SPU Unit to which the settings will be transferred.
2. In the SPU-Console, select ***To Unit*** from the File Menu.

5-4-5 Transferring Settings Edited Offline to the SYSMAC SPU Unit

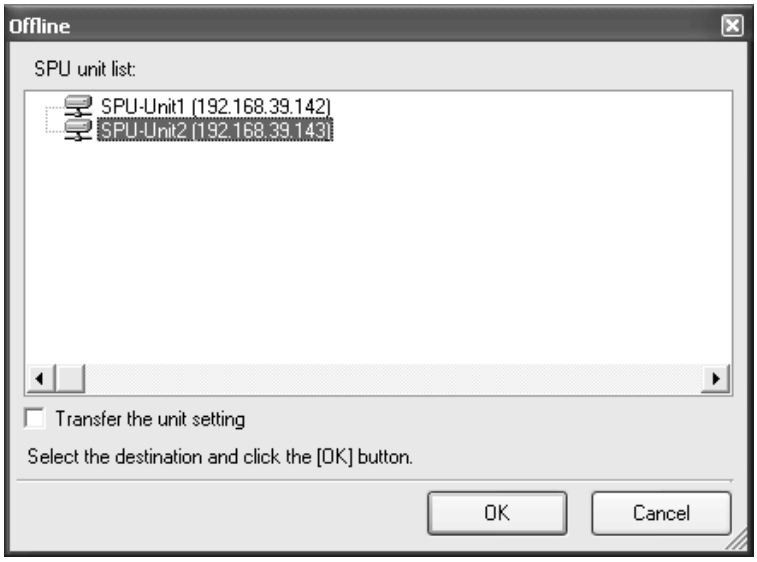
Settings created using offline editing can be transferred to the SYSMAC SPU Unit without needing to execute the *Connect* command from the File Menu in the SYSMAC SPU Unit.

The SPU-Console will automatically read the settings from the current SYSMAC SPU Unit when the SYSMAC SPU Unit is connected. Therefore, when the SYSMAC SPU Unit is connected after creating settings using offline editing, the settings in the current SYSMAC SPU Unit will be overwritten, so the saved settings must be transferred again after being read.

Use the following procedure to transfer settings edited offline to the SYSMAC SPU Unit without going through the connection-read-transfer operation.

1,2,3...

1. Execute offline editing.
2. Select ***To Unit*** from the File Menu.
3. Select from the Offline Dialog Box the SYSMAC SPU Unit to which the settings are to be transferred, and click the **OK** Button.



4. To enable the transferred settings in the SYSMAC SPU Unit, execute the SYSMAC SPU Unit's *Change the Sampling Settings* command.

Note The transferred settings will be saved in the SYSMAC SPU Unit, but will not be enabled until the *Change the Sampling Settings* (*Change the Data Collection Settings*) command is executed.

5-5 Recording Files

5-5-1 Location of Record Files

The data files resulting from recording are saved in a Memory Card mounted in the SYSMAC SPU Unit. The record files are placed in a folder called "Journal." The file names are specified when setting sampling (data collection settings).

Note Do not delete the files inside the Journal folder.
The SYSMAC SPU Unit will not operate correctly without these files.

5-5-2 Accessing Record Files on a Windows Network

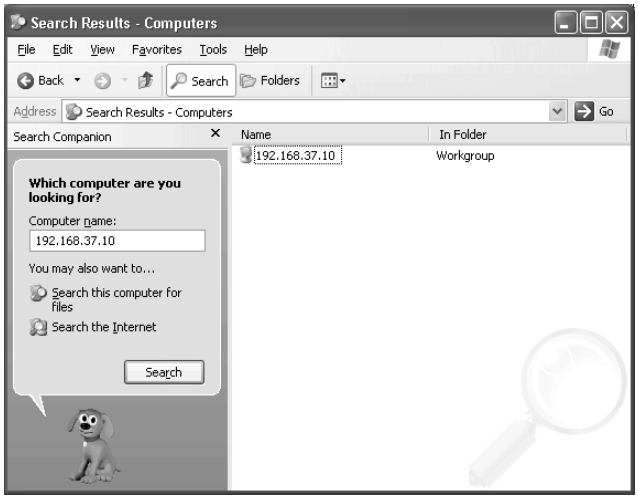
The data files saved in a Memory Card mounted in the SYSMAC SPU Unit can be accessed using a shared folder on a Windows network. The shared folder on the Memory Card is \pccards\PCCard1. Use the following procedure to access the record files from the computer.

1,2,3... 1. Search for network SYSMAC SPU Units using the Search for Computers command.

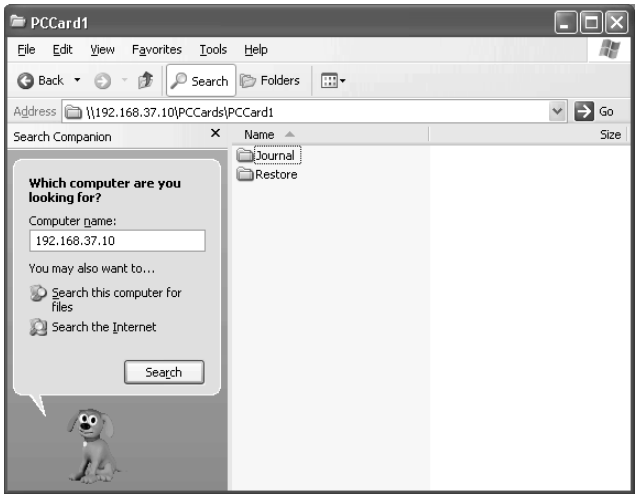
- For Windows XP, right-click ***My Network Places*** on the **Start** Menu and then select ***Search for Computers.***
- For Windows XP, right-click ***My Network Places*** on the desktop and then select ***Search for Computers.***

2. Input the Unit Name or IP address for the *Computer name* and then click the **Search** Button.

   The following display will appear if the SYSMAC SPU Unit is found.



3. Double-click the SYSMAC SPU Unit that was found and open the following folders in order: ***PCCards - PCCard1 - Journal.***



Note The following method can also be used to easily access the SYSMAC SPU Unit shared folder from the computer.

(1) Click the **Sampling Setting** Tab (Collection Setting Tab) in the SPU-Console and then select ***View - Display the Unit Folder.*** Explorer will be started and the shared folder for the SYSMAC SPU Unit will be displayed.

(2) Input the UNC address of the shared folder in the SYSMAC SPU Unit in the address bar of Explorer. For example, input \\192.168.0.100\.

5-5-3 Format of Record Files

The record files are text files in CSV format, as shown below.

```
index,clocktime,nano,SampleIndex,Tag-0000,Tag-0001,Tag-0002,Tag-0003
1,2004-06-16 11:16:40.443,0443637440,0,  502,18196,32983,18948,
2,2004-06-16 11:16:40.453,0453636704,1,  548,18196,33024,18948,
3,2004-06-16 11:16:40.463,0463635968,2,  607,18196,33077,18948,
4,2004-06-16 11:16:40.473,0473635232,3,  667,18196,33131,18948,
5,2004-06-16 11:16:40.483,0483634496,4,  727,18196,33185,18948,
6,2004-06-16 11:16:40.493,0493633760,5,  777,18196,33229,18948,
7,2004-06-16 11:16:40.503,0503633024,6,  836,18196,33282,18948,
8,2004-06-16 11:16:40.513,0513632288,7,  900,18196,33339,18948,
9,2004-06-16 11:16:40.523,0523631552,8,  950,18196,33384,18948,
10,2004-06-16 11:16:40.533,0533630816,9, 1006,18196,33434,18948,
```

A header code is placed on the first line. Data codes are placed on the remaining lines. The data code is described in the following table.

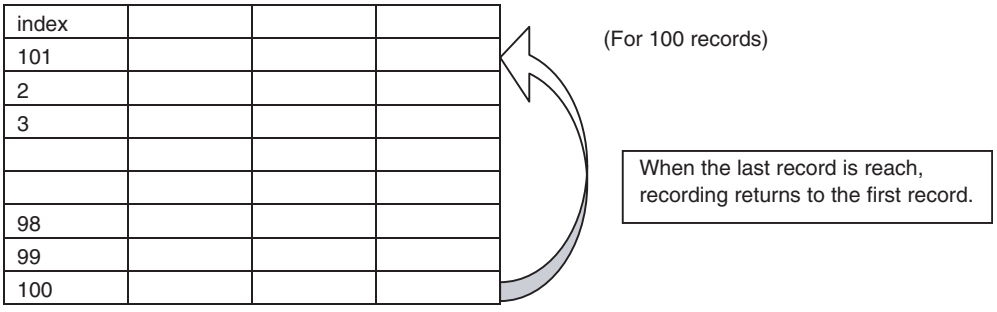
Field	Item	Meaning
1st field	Index	The index number for the data code. The index is reset to 1 when sampling (data collection) settings or record files are cleared.
2nd field	Time stamp	The time at which recording was performed. YYYY-MM-DD hh:mm:ss.ms
3rd field	Nanoseconds	The nanoseconds at which recording was performed. The value is given in nanoseconds.
4th field	Sampling index	An index number started from 0 when recording is started.
Remaining fields	Sampling data	The 5th and later fields contain the sampling data in order.
Return		A line feed code (LF = 0x0A) is placed at the end of the line. This is different from the Windows return code (CR + LF).

Note Each sampling file has a maximum size of 2 GB.

5-5-4 Saving Record Files

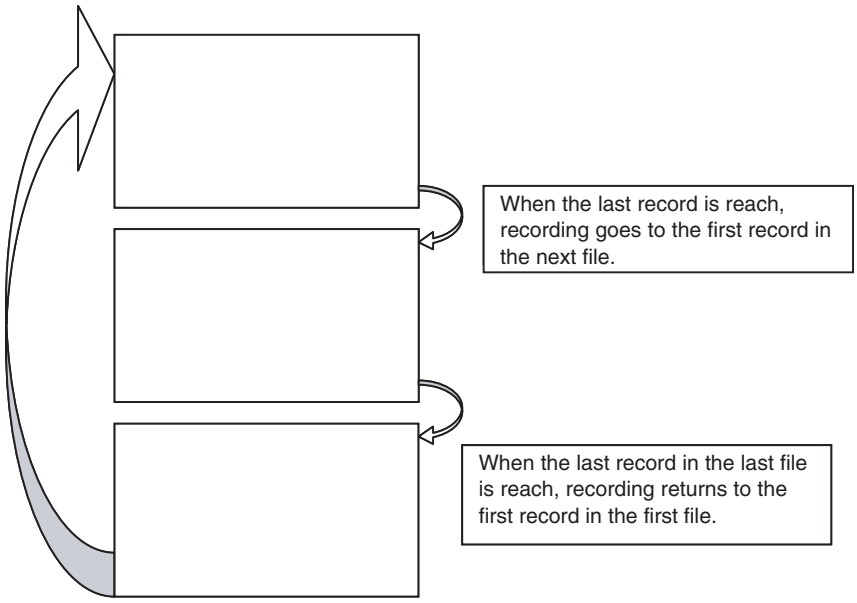
Saving in One File

The number of records saved in one file is specified in advance in the sampling (data collection) settings. When enough data codes have been saved to reach the last line, data codes are saved starting at the first record.



Saving in Multiple Files

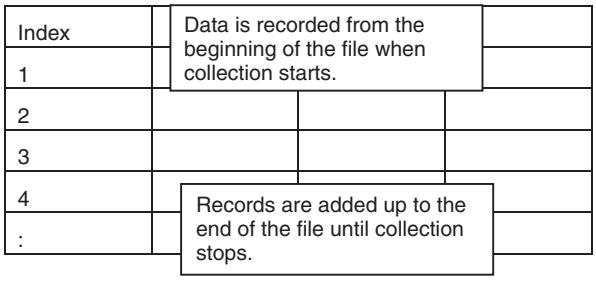
When saving data in multiple files, if the data record reaches the last line, recording will continue from the beginning of the next file. When the last line of the final file is reached, recording will resume from the beginning of the first file.



Note The settings for record files (e.g., format and saving method) are saved in the Journal folder in the Memory Card containing the record files. These settings are saved by executing command 20 (Change the sampling settings (Change the data collection settings)).
If record file settings on the Memory Card differ from those in the SYSMAC SPU Unit, sampled data will not be recorded correctly. This can happen, for example, when a Memory Card created for a different SYSMAC SPU Unit is used. If this happens, update the record file settings by executing command 20 (Change the sampling settings (Change the data collection settings)).

Saving without Specifying the Number of Records

When data is saved without specifying the number of records, recording starts from the first record when collection begins. Data is recorded in one file until data collection stops. The data collected from starting to stopping collection can be saved in a single file.



Note

(1) When data is saved without specifying the number of records, the size of the file will continue to increase until collection stops. Make sure that the capacity of the Memory Card is sufficient when saving using this method.

(2) When data is saved in a single file without specifying the number of records, the previous data in the file is cleared when collection starts. When not specifying the number of records, saving in multiple files is recommended.

SECTION 6
Executing Commands

This section describes how to execute commands for SYSMAC SPU Units.

6-1 Command Types and Execution

The SYSMAC SPU Unit supports various commands. For example, *Display the IP address*, *Start all samplings*, and *Restart Unit* commands are supported. The following methods can be used to execute commands.

Executing Commands from the SPU-Console

Execute the commands from the SPU-Console connected to the SYSMAC SPU Unit.

Executing Commands from the SYSMAC SPU Unit

Execute the commands using the SYSMAC SPU Unit's **SELECT** Switch and **ENTER** Button.

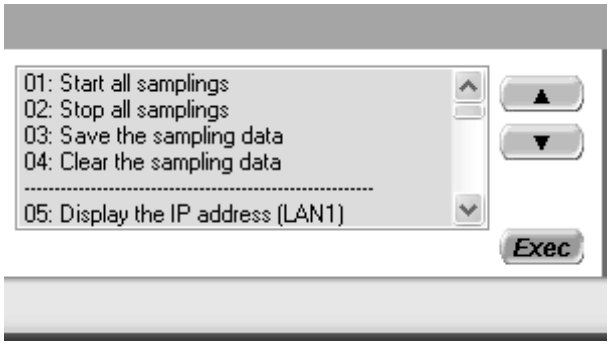
Executing Commands from the CPU Unit

Execute SYSMAC SPU Unit commands from the I/O memory in the PLC's CPU Unit. The available command types depend on the operating mode.

For details on supported commands in each operating mode, refer to *12-1 Commands* and *18-1 List of Data Storage Mode Commands*.

6-2 Executing Commands from the SPU-Console

Commands are executed from SPU-Console's Control Panel. Select the command to execute in the Command Selection Box and then click the **Exec** Button.



Note Commands can also be executed by selecting ***Command - Execute a Command.***

6-3 Executing Commands from the SYSMAC SPU Unit

The **SELECT** Switch and **ENTER** Button are used to execute commands from the SYSMAC SPU Unit.

Selecting the Command with the SELECT Switch

Press the switch up to increase the command code.

Press the switch down to decrease the command code.

The currently selected command code will be displayed on the 7-segment display.

Executing the Command with the ENTER Button

Use the **ENTER** Button to execute the command selected with the **SELECT** Switch.

Press the **ENTER** Button once. The command code will flash on the 7-segment display.

Press the **ENTER** Button again. "A" will be displayed on the 7-segment display and the command will be executed.

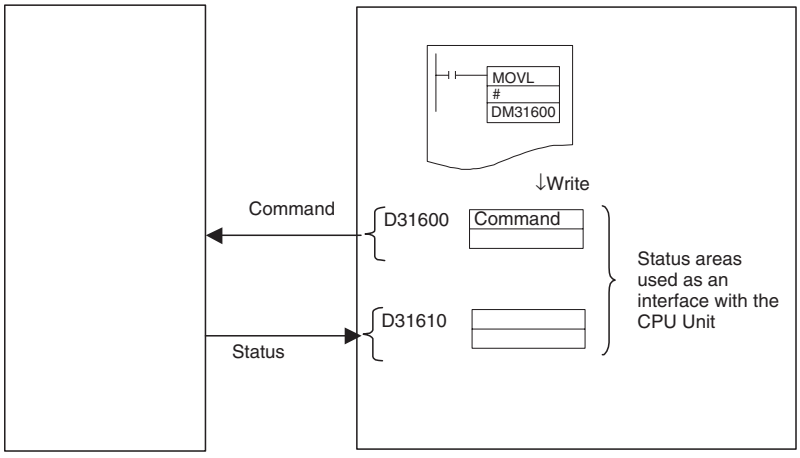
To cancel executing the command, wait for 10 seconds before pressing the **ENTER** Button the second time.

6-4 Executing Commands from the CPU Unit

SYSMAC SPU Unit commands can be executed from the CPU Unit.

The I/O memory words allocated as a CPU Unit interface to the SYSMAC SPU Unit are called status areas. A SYSMAC SPU Unit command can be set in a status area to operate the SYSMAC SPU Unit from the CPU Unit. The command can set from the ladder program, a Programming Device, etc.

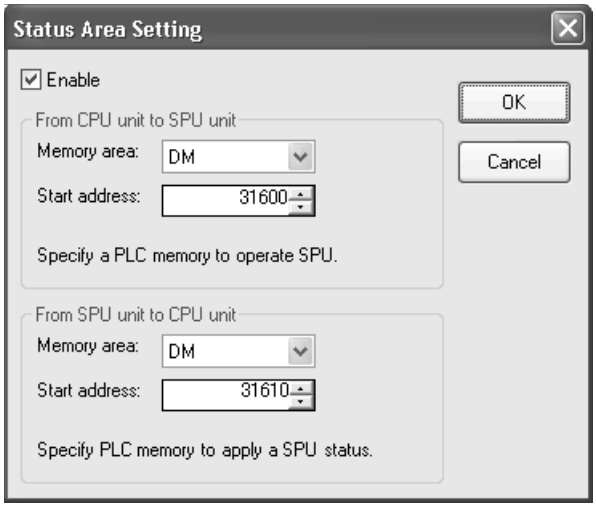
Any of the commands listed in *12-1 Commands* can be executed.



This method can be used, for example, to start and stop sampling from the ladder program in the CPU Unit.

The addresses of the status areas can be changed by clicking the **Sample Setting** (**Collection Setting**) Tab in SPU-Console and then selecting ***Variable Setting - Status Area Setting.***

Note Always reconfirm any settings being made in the status area from the CPU Unit.
Status may not be correctly notified if the setting is not correct.



Enable Select the *Enable* option to enable using the status areas. These areas will be used to execute commands from the I/O memory of the CPU Unit and send SYSMAC SPU Unit status to the I/O memory of the CPU Unit.

Set the addresses of the status areas in the I/O memory so that the control program in the CPU Unit is not affected.

From CPU to SYSMAC SPU Unit

Specify the memory area and start address of the words for writing commands from the CPU Unit to the SYSMAC SPU Unit. Two words will be allocated for this area. Specified commands are set in the first word.

From SYSMAC SPU Unit to CPU Unit

Specify the memory area and start address of the words for writing status from the SYSMAC SPU Unit. Two words will be allocated for this area.

The values placed in the first word and their meanings (SYSMAC SPU Unit status) are given in the following table.

Value	Status	Meaning
0	Idle	SYSMAC SPU Unit is in idle status.
1	Change the settings	Sampling or Unit settings are being changed.
2	Sampling	Sampling is being performed.
3	Initialization	The SYSMAC SPU Unit is being initialized.
4	Archive	Sampling data is being saved or sampling settings are being recovered.

SECTION 7
Sampling Mode

This section introduces the SYSMAC SPU Unit's Sampling Mode.

The following sections provide information on the SPU-Console operation methods when using the SYSMAC SPU Unit's Sampling Mode.
For information on the methods used to check whether the SYSMAC SPU Unit is operating in Sampling Mode, refer to *4-2 Confirming the Operating Mode*. For information on changing the SYSMAC SPU Unit's operating mode to Sampling Mode, refer to *4-3 Changing the Operating Mode*.

7-1 Sampling Mode Introduction

The Sampling Mode is used to sample part of the PLC's I/O memory at regular intervals and record the sampled data. The time intervals are nearly constant, so the data can be recorded at particular times and more reliable information can be reproduced from the collected data.

The Sampling Mode settings specify the data that will be sampled from the PLC's I/O memory and how the data will be sampled.

The data that will be sampled is specified in units called variables. The variables specify the PLC's I/O memory address and data type. The data is converted to the specified data type and recorded. The value can also be scaled during the data-type conversion.

The Sampling Mode's collection pattern is called the sampling pattern. There are four sampling patterns: the realtime sampling pattern and sampling patterns 1 to 3. Each sampling pattern has independent specifications for the sampling time interval, number of records, save filenames, and number of files.

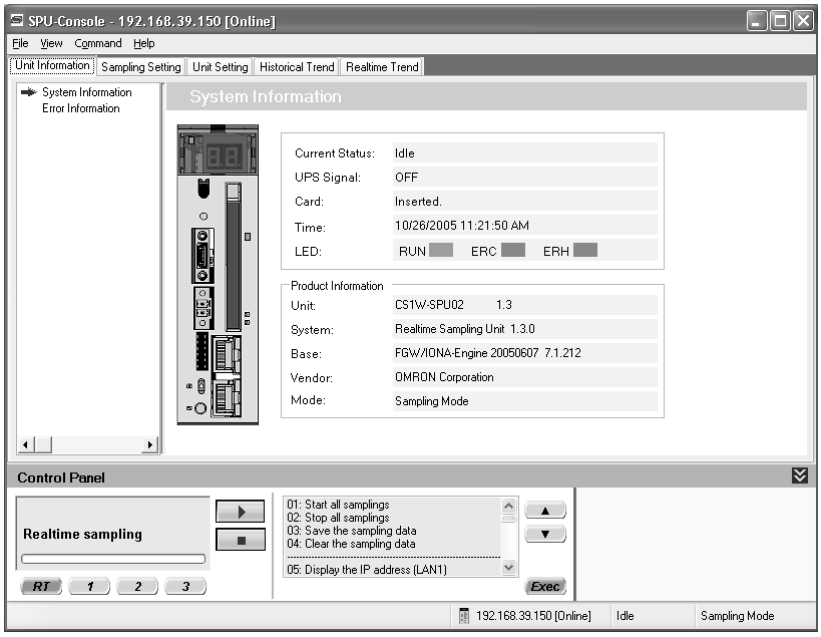
Of these four sampling patterns, the realtime sampling pattern's time interval can be nearly constant. Also, the realtime sampling pattern provides high-speed sampling with intervals from a few ms to about 50 ms. (The speed depends on the number of bits being sampled.)

SECTION 8
Monitoring SYSMAC SPU Unit Operating Status

This section describes how to monitor SYSMAC SPU Unit operating status and error status.

8-1 Displaying System Information

The operating status of an SYSMAC SPU Unit can be monitored from the System Information display on the Unit Information Tab Page.



System Information Display Items

Item	Content
Current Status	Operating status of the current SYSMAC SPU Unit
PF-IN Signal	Status of the power failure signal
Card	Whether a PC card is inserted in the SYSMAC SPU Unit
Time	The time in the SYSMAC SPU Unit
LED	The status of the RUN, ERC, and ERH indicators
Product Information	The SYSMAC SPU Unit model number and system program version

Current Status

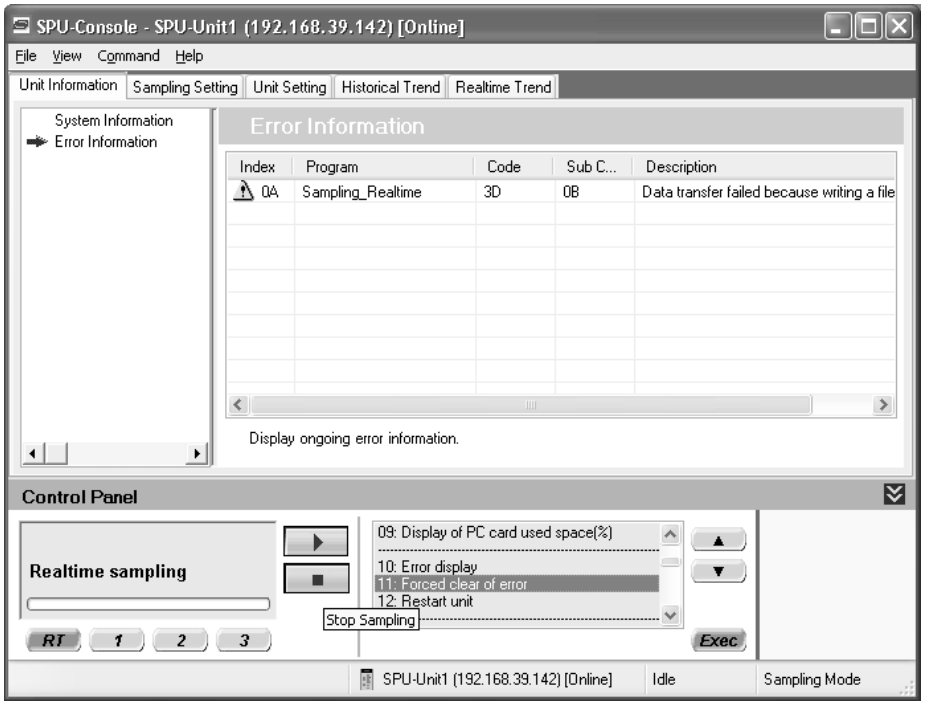
The SYSMAC SPU Unit current status contains the following status.

Status	Meaning
Idle	SYSMAC SPU Unit is in idle status.
Sampling	Sampling is being performed.
Change the settings	Sampling or Unit settings are being changed.
Archive	Sampling data is being saved or sampling settings are being recovered.
Initialization	The SYSMAC SPU Unit is being initialized.

8-2 Displaying Error Information

The error status of an SYSMAC SPU Unit can be monitored from the Error Information Window on the Unit Information Tab Page.

Refer to *Appendix A Troubleshooting with Error Codes* for details on error codes.



Note Error information is deleted in the following cases.

(1) When the SYSMAC SPU Unit is restarted

(2) When errors are eliminated

(3) When sampling settings or unit settings are made

(4) When command 11 (Forced Clear of Error) is executed

SECTION 9
Sampling Settings for Sampling Mode

This section explains how to make the sampling settings for Sampling Mode operation.

9-1 Making the Sampling Settings

The following list shows the basic steps to follow from making the sampling settings to sampling data.

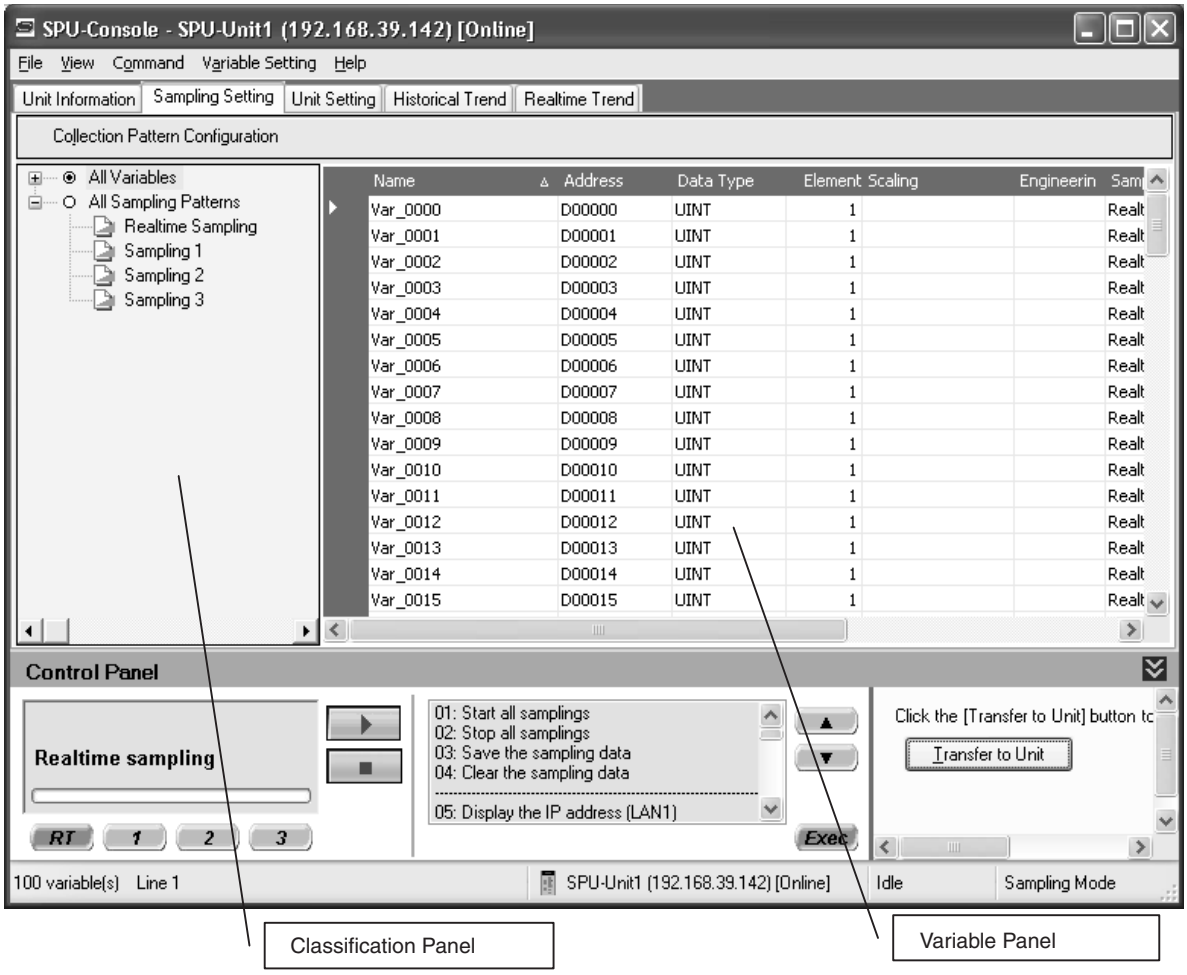
1,2,3...

1. Set the variables and sampling patterns.
2. Reflect the settings in the SYSMAC SPU Unit.
3. Perform sampling.
4. Display the sampling results folder.

9-2 Sampling Setting Windows and Operations

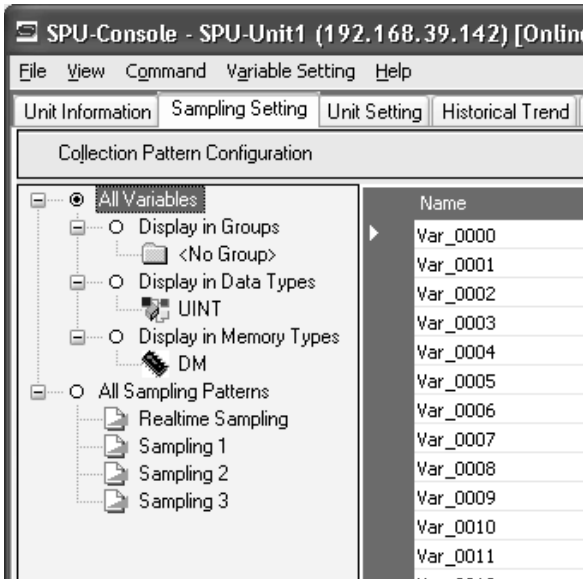
9-2-1 Window Structure

Click the SPU-Console's **Sampling Setting** Tab to display the Sampling Setting Window.



9-2-2 Operations in the Classification Panel

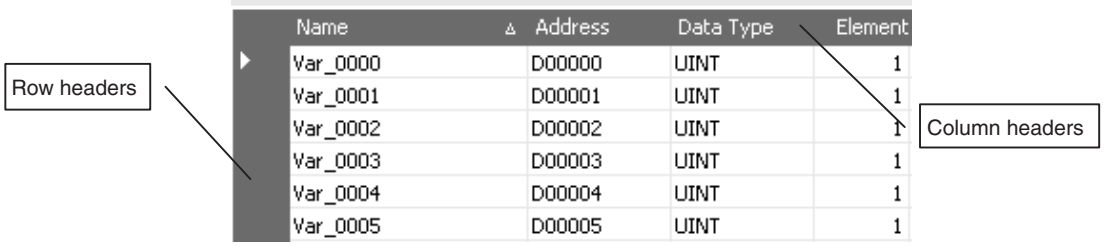
The following table explains the basic operations in the Classification Panel.



Item		Operation method and function
All Variables		If this option is selected, all of the set variables will be displayed.
	Display in Groups	When variables have been grouped, this option can be selected to organize and display the variables by group.
	Display in Data Types	If this option is selected, variables will be organized and displayed by data type, such as UINT and REAL.
	Display in Memory Types	If this option is selected, variables will be organized and displayed by the variables' data area addresses, such as DM.
All Sampling Patterns		If this option is selected, all of the sampling pattern information will be displayed.
	Sampling patterns	If this option is selected, the variables to be sampled will be displayed. For example, if variable X is displayed under *Realtime Sampling*, variable X will be recorded in realtime sampling.

9-2-3 Basic Operations in the Variable Panel

This section describes the name and meaning of each part of the Variable Panel.



The following table describes the columns.

Column	Meaning
Name	Shows the variable's name.
Address	Shows the variable's I/O memory address in the PLC.
Data Type	Shows the variable's data type. Data from the PLC's I/O memory is converted to this data type and recorded.
Element Scaling	Specifies the number of elements in array-type data. When the number of elements is 1, the data is not an array.
Engineering	Specifies the industrial units as the user-set text string.
Sampling Pattern	Specifies the sampling pattern in which this variable is recorded.
Description	Shows a user-set description of the variable.

The following basic operations can be performed in the Variable Panel.

Changing the Name, Number of Elements, Units, or Description

Click the cell to be changed and directly input the new text.

Changing the Address

Select the cell to be changed, click the **...** Button, input the new address in the displayed window, and click the **OK** Button. The new address can also be input directly in the cell as a text input.

Changing the Data Type

Select the cell to be changed and select the new data type from the displayed drop-down list.

Changing the Sampling Pattern

Select the cell to be changed, click the **...** Button to display the dialog box, and select (check) the sampling patterns in which the selected variable will be sampled.

Selecting Variables

Selecting a Single Variable

Click the desired variable's row header cell.

Selecting Multiple Variables

Press and hold the **Ctrl** Key while clicking the row header cells of multiple variables.

Selecting a Range of Consecutive Variables

Click the first variable's row header cell. Press the **Shift** Key while and click the last variable's row header cell.

Selecting All Variables

Press the **Ctrl+A** Keys.

Note When using Windows XP, the menu displayed when you right-click on the Variable Panel will include *Insert Unicode control character*, but this command cannot be used.

9-3 Setting Variables

The data to be sampled is specified with units called variables. Before sampling, register each variable with the desired variable name, CPU Unit address, data type, and number of elements. Set the variables in the Variable Panel.

The variables can also be set with OMRON's CX-Programmer Support Software (version 2.0 or later) on the Variable Tab Page.

9-3-1 Adding Variables

The procedure for adding variables depends on the point clicked in the Classification Panel.

Directory tree under *All Variables*	The variable will be added, but it won't be registered in the sampling pattern. To register the variable in a sampling pattern, it is necessary to select *Register to the Collection Pattern*.
Directory tree under *All Sampling Patterns*	The added variable will be registered in the selected sampling pattern.

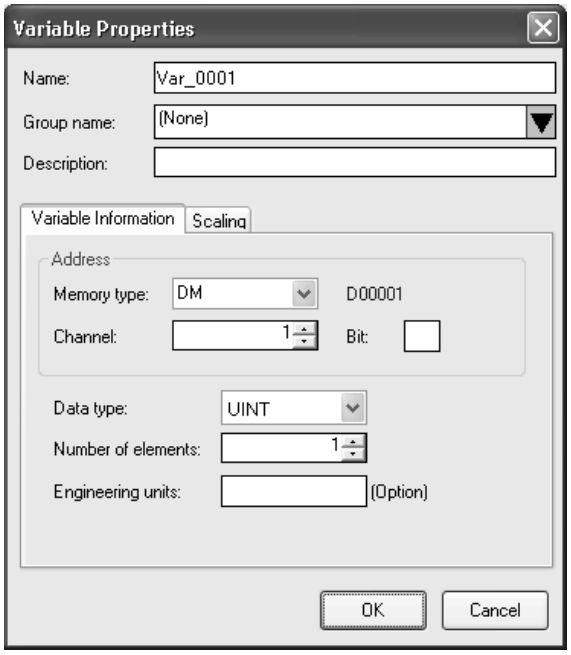
1,2,3...

1. Click the SPU Console's **Sampling Setting** Tab.
2. Select ***Variable Setting - Add Variable*** or right-click the Variable Panel and select ***Add Variable*** from the popup menu.

   The Variable Properties Dialog Box will be displayed. For details, refer to *9-3-2 Operations in the Variable Properties Dialog Box*.

9-3-2 Operations in the Variable Properties Dialog Box

Use the Variable Properties Dialog Box to make variable settings such as the variable's address and data type. Enter the new settings in the dialog box and click the **OK** Button to change the variable's settings.



The following table describes the variable's settings.

Item	Function
Name	Sets the variable's name.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

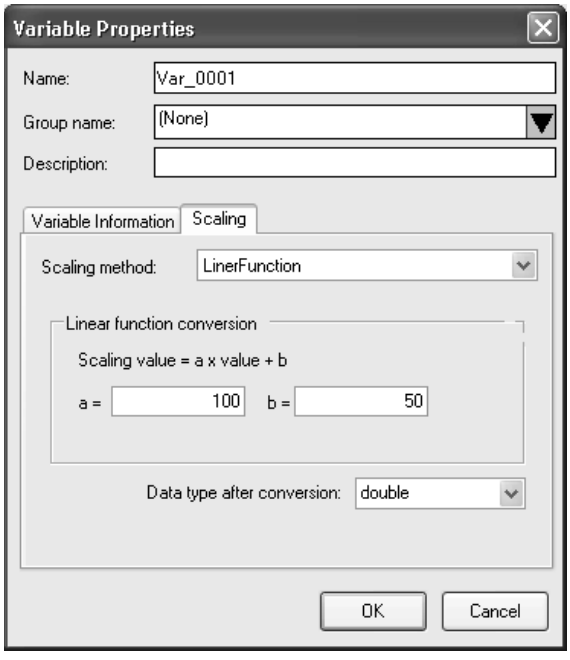
Item	Function
Address	Specifies the variable's memory location. Specify the data area in the *Memory type* Field and specify the offset from the beginning of the data area in the *Channel* Field. If the variable represents a bit, specify the bit number (0 to 15) in the *Bit* Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type.
Number of elements	Specifies the number of elements of data for a data array. A number of consecutive data elements with the same properties can be handled as a single variable. When the data type is set to *STRING*, the *Number of elements* sets the length of the string.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *9-3-3 Setting the Scaling Function for a Variable*.

9-3-3 Setting the Scaling Function for a Variable

If a variable requires scaling, the scaling method can be specified on the Variable Properties Dialog Box's Scaling Tab Page. If a variable does not require scaling, it isn't necessary to specify scaling function.



The following table describes the *Scaling methods* on the Scaling Tab Page.

Item	Function
Linear function conversion	The memory value is converted with a linear equation and the result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*. The result is calculated from the specified constants (a and b) as follows: Result = a × memory value + b
Maximum/Minimum conversion	Memory values with a predetermined upper and lower limit are converted according to that upper and lower limit range and the result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*.
Decimal position conversion	The memory value's decimal point can be moved from left to right to the specified position. The result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*.

9-3-4 Adding Multiple Variables Together

A number of consecutive variables with the same properties can be registered together.

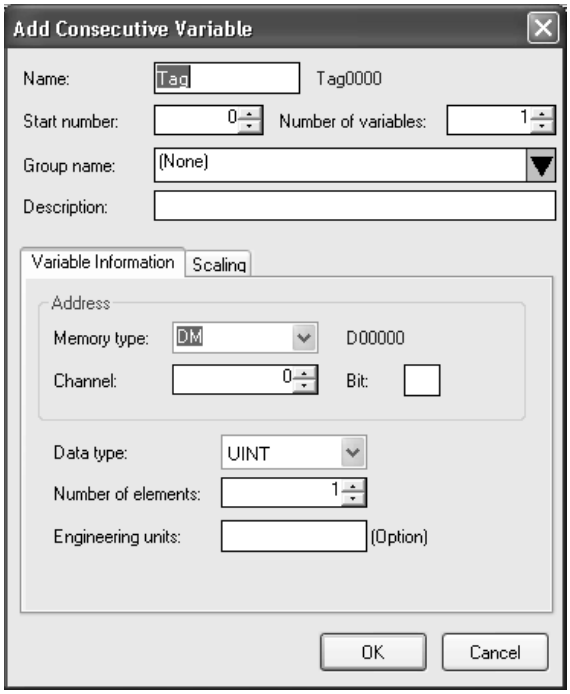
1,2,3...

1. Click the SPU Console's **Sampling Setting** Tab.
2. Select ***Variable Setting - Add Consecutive Variables*** or right-click the Variable Panel and select ***Add Consecutive Variables***.

   The Add Consecutive Variables Dialog Box will be displayed. For details, refer to *9-3-5 Operations in the Add Consecutive Variables Dialog Box*.

9-3-5 Operations in the Add Consecutive Variables Dialog Box

Use the Add Consecutive Variables Dialog Box to set a number of consecutive variables with the same properties. make variable settings such as the variable's address and data type. Enter the settings in the dialog box and click the **OK** Button to register the consecutive variables.



The following table describes the array variable's settings.

Item	Function
Name	Sets the variable's name. An index number will be attached after the variable name.
Start number	Specifies the starting number of the index number that appears after the variable name.
Number of variables	Specifies the number of variables being added.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

Item	Function
Address	Specifies the variable's memory location. Specify the data area in the *Memory type* Field and specify the offset from the beginning of the data area in the *Channel* Field. If the variable represents a bit, specify the bit number (0 to 15) in the *Bit* Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type.

Item	Function
Number of elements	Specifies the number of elements of data for a data array. A number of consecutive data elements with the same properties can be handled as a single variable. When the data type is set to *STRING*, the *Number of elements* sets the length of the string.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *9-3-3 Setting the Scaling Function for a Variable*.

9-3-6 Using the CX-Programmer's Variables

Variables set with the CX-Programmer can be used.

1,2,3... 1. Start the CX-Programmer and display the variable table.
2. Select the variables to be used in the SPU-Console and select ***Edit - Copy***.
3. Click the SPU-Console's **Sampling Setting** Tab and display the Variable Panel.
4. Select ***Variable Setting - Paste from the Clip Board***. If the variable does not have a variable name, a variable name will be allocated automatically based on the variable's address and comment information.

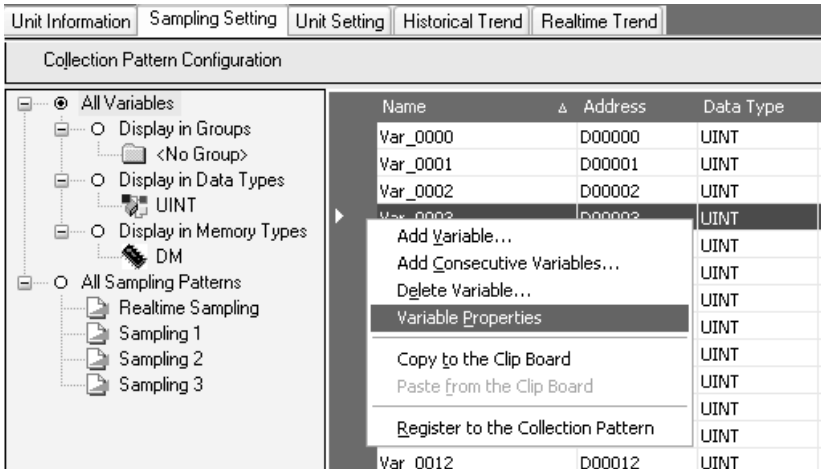
Note This function is supported by CX-Programmer version 2.0 and later versions. The following variables cannot be pasted.

- Variables with data type LINT, ULINT, ULINT_BCD, or NUMBER
- Variables with automatically allocated addresses

9-3-7 Changing Variables

1,2,3... 1. Click the SPU Console's **Sampling Setting** Tab and display the Variable Panel.
2. Select the variable to be changed by clicking that variable's row header cell.

3. Select ***Variable Setting - Variable Properties*** or right-click the Variable Panel and select ***Variable Properties*** from the popup menu.



4. Enter the new settings in the Variable Properties Dialog Box and click the **OK** Button. For details on these operations, refer to *9-3-2 Operations in the Variable Properties Dialog Box*.

9-3-8 Deleting Variables

1,2,3...

1. Click the SPU Console's **Sampling Setting** Tab and display the Variable Panel.
2. Select the variable to be changed by clicking that variable's row header cell in the list. To select more than one variable, select the first variable, press and hold the **Ctrl** or **Shift** Key, and click the row header cell of the other variables to be deleted.
3. Select ***Variable Setting - Delete Variable*** or right-click the Variable Panel and select ***Delete Variable*** from the popup menu.

9-3-9 Selecting a Sampling Pattern and Adding Variables

When the sampling pattern has been decided in advance, the sampling pattern can be selected and a variable can be added to that pattern. The added variable will be automatically sampled and recorded in the specified sampling pattern.

1,2,3...

1. Click the SPU Console's **Sampling Setting** Tab and display the Classification Panel.
2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
3. Select ***Variable Setting - Add Variable*** or right-click the Variable Panel and select ***Add Variable*** from the popup menu.

   The Variable Properties Dialog Box will be displayed. For details on the dialog box operations, refer to *9-3-2 Operations in the Variable Properties Dialog Box*.

9-3-10 Deleting Variables from a Sampling Pattern

A registered variable can be deleted from a sampling pattern. The variable's settings are not deleted even though the variable is deleted from the sampling pattern. The deleted variable can still be found and reused in the Variable Panel's *All Variables* directory.

1,2,3...

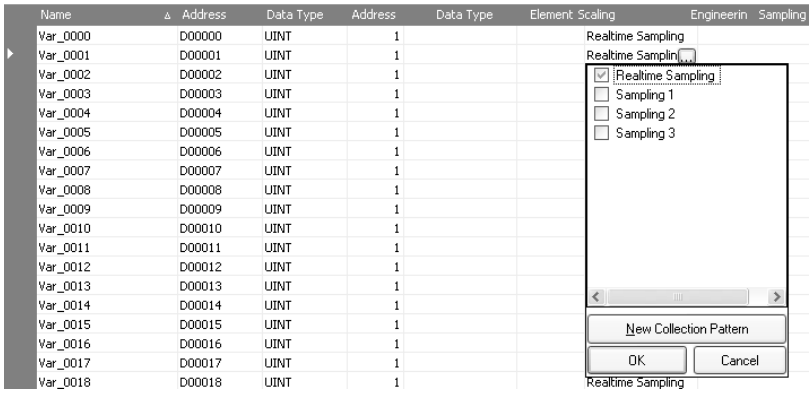
1. Click the SPU Console's **Sampling Setting** Tab and display the Classification Panel.
2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
3. Select the variable to be deleted by clicking that variable's row header cell.
4. Select ***Variable Setting - Delete Variable*** or right-click the Variable Panel and select ***Delete Variable*** from the popup menu.

9-3-11 Registering an Existing Variable in a Sampling Pattern

A variable that was set previously can be specified and registered in a sampling pattern. A variable can also be registered in multiple sampling patterns, which allows the same variable to be sampled and recorded by multiple methods.

1,2,3...

1. Click the SPU Console's **Sampling Setting** Tab and display the Variable Panel corresponding to the Classification Panel's *All Variables* directory.
2. Click the desired variable's cell in the *Sampling Pattern* column and click the **...** Button.
3. A popup window will be displayed. Select the sampling patterns in which the variable will be registered (by adding checks next to those patterns) and click the **OK** Button.



Note There are two other ways to register the variables:

- Register the variables by selecting ***Variable Setting - Register to the Collection Pattern***.
- Register the variables by dragging and dropping them.

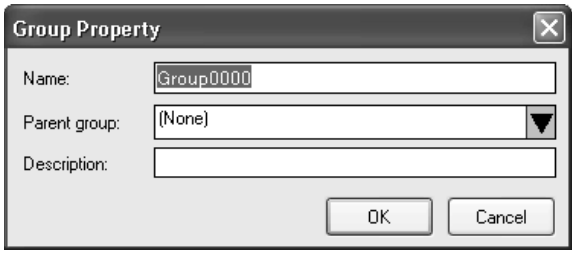
9-3-12 Managing Variables in Groups

Variables can be organized and managed in groups.

Creating a Group

To create a group, select the *Display in Groups* Option in the Classification Panel and select ***Variable Setting - Add Group***.

The Group Property Dialog Box will be displayed.



Add the group's name in the *Name* Field. A description of the group can be entered in the *Description* Field. (This entry can be omitted.)

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

Deleting a Group

To delete a group, select the group to be deleted in the Classification Panel and select ***Variable Setting - Delete Group***.

If a group is deleted, all of the settings under the group will be deleted.

Changing the Group Name

To change a group's name, select the group and select ***Variable Setting - Group Properties***.

Copying to a Group

To copy a variable to another group, select the variable to be copied in the Variable Panel, press and hold the **Ctrl** Key, and drag and drop the variable in the destination group in the Classification Panel.

Moving a Group

To move a variable to another group, select the variable to be moved in the Variable Panel and drag and drop the variable in the destination group in the Classification Panel.

9-3-13 Changing the Order of Variables in a Sampling Pattern

Variable data is recorded in a file in the order in which the variables appear in the Variable Panel. The recording order can be changed by moving a variables to a different position in the list.

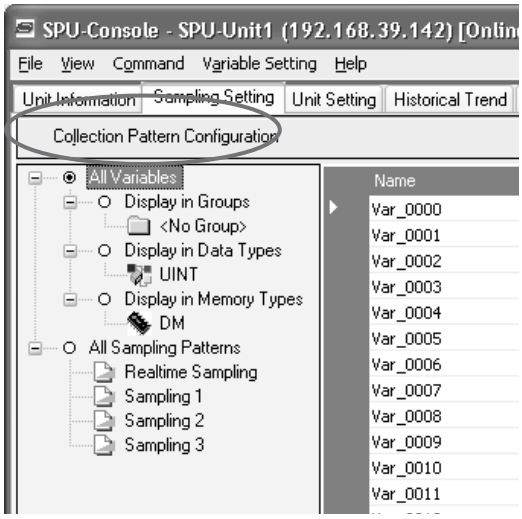
1. Click the SPU Console's **Sampling Setting** Tab and display the Classification Panel.
2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
3. Select the variable to be moved by clicking that variable's row header cell in the list.
4. Drag the selected variable and drop it in the destination location.

9-4 Setting Sampling Patterns

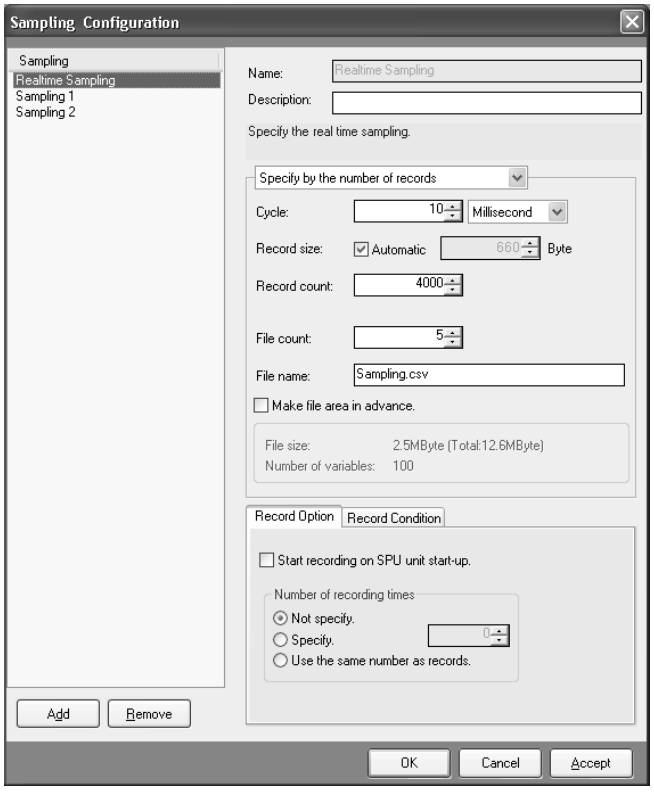
9-4-1 Adding a Sampling Pattern

1,2,3... 1. To add a sampling pattern, click the SPU Console's **Sampling Setting** Tab and select ***Collection Pattern Configuration***.

The Sampling Configuration Dialog Box will be displayed.



2. Click the **Add** Button in the Sampling Configuration Dialog Box.



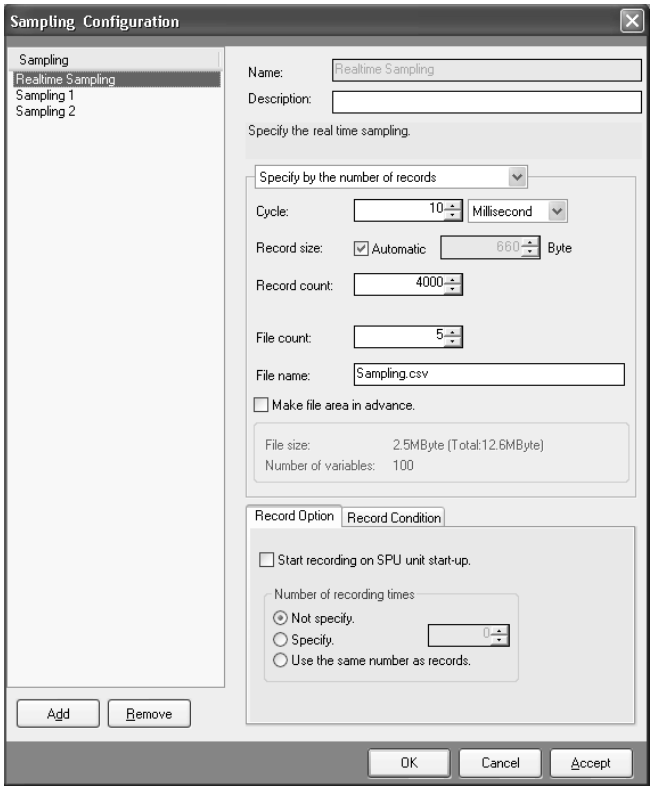
3. Input the settings such as the *Name* and *Description*.

The following table describes the settings.

Item	Function
Name	Input the sampling pattern's name.
Description	Input a description of the sampling pattern.
Cycle	Specify the sampling cycle.
Record size	In most cases, select the *Automatic* Option. When *Automatic* is selected, the record size is calculated automatically. When specifying the record size, specify the size of each record that will be stored in the file in bytes.
Record count	Specify the number of records that will be stored in a single file. (Specify the *Record count* when *Specify by the number of records* is selected.)
Period	Specify a period of time in which records will be stored in a single file. (Specify the *Period* when *Specify by the collection period* is selected.)
File count	Specify the number of files to be stored. When multiple files are being stored, the files are stored in a folder with the same name as the specified *File name*. The file names will be the specified *File name* with an attached index number.
File name	Specify the name of the file in which the results will be stored.
Make file area in advance.	When this option is selected, files of the specified size are created when the new settings are accepted. Since the files are created before starting to collect data, there will not be an insufficient memory error during collection. **Note** When this option is selected, it will take some time to create the files after the settings are OKed or Accepted.

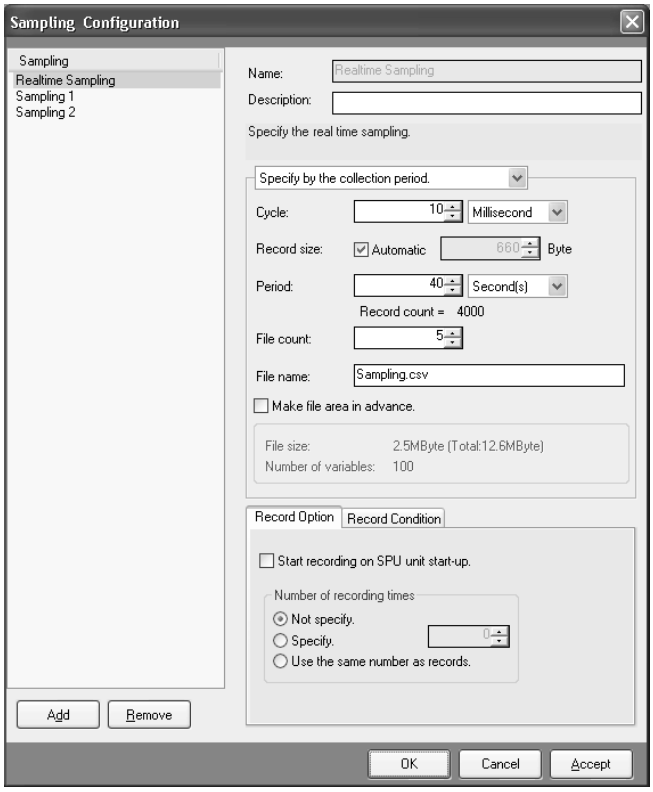
Specifying the Number of Records

When *Specify by the number of records* is selected, the number of records recorded in a single file is fixed at the specified number.



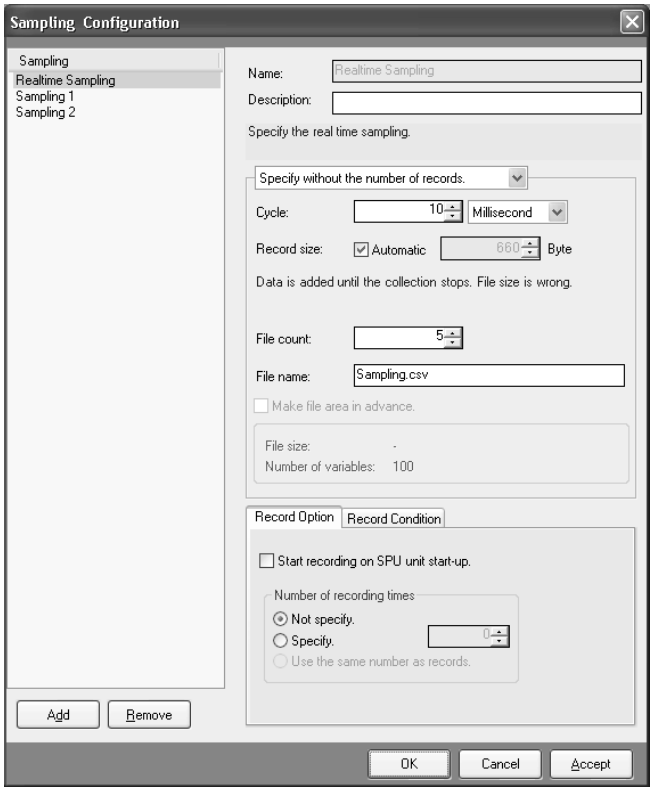
Specifying the Collection Period

When *Specify by the collection period* is selected, the number of records recorded in a single file is determined by the period and cycle settings. The number of records recorded in a single file is fixed.



Unspecified Number of Records

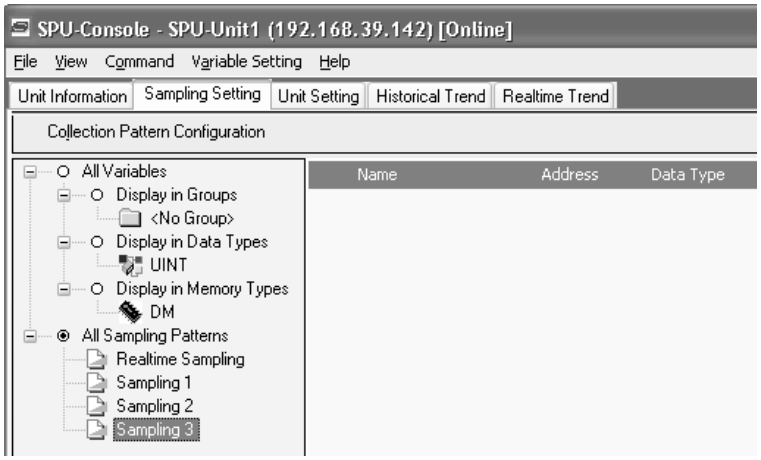
When *Specify without the number of records* is selected, data will be added to the file until data collection is stopped. With this method, all of the records from the start to the end of sampling can be recorded in a single file.



Note (a) When saving data without a specified number of records, the file size will continuously increase until data collection is stopped. Be sure that there is enough memory available in the Memory Card.

(b) When saving data in a single file and leaving the number of records unspecified, existing data in the file will be cleared when collection starts. We recommend saving data in multiple files when leaving the number of records unspecified.

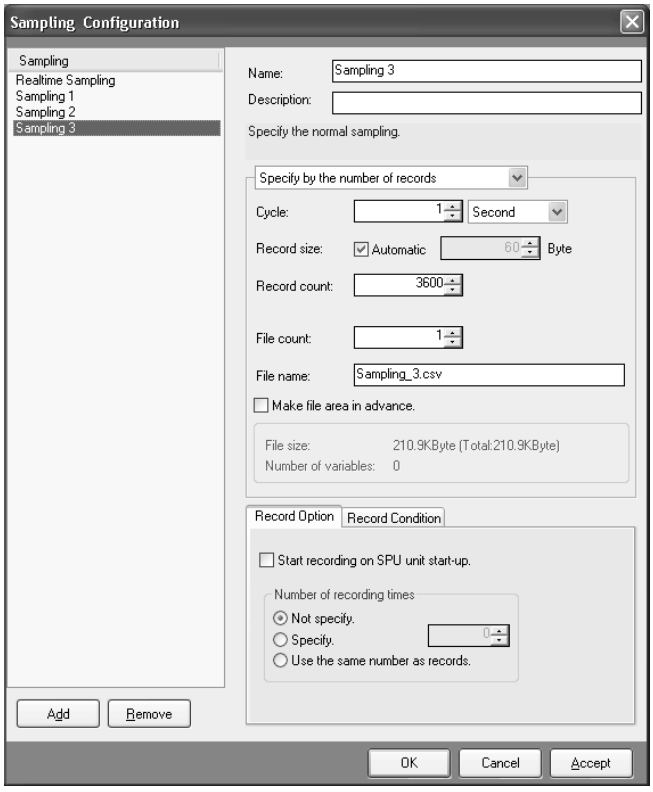
4. After inputting the settings, click the **OK** or **Accept** Button.
5. Confirm that the sampling pattern has been added to the Classification Panel's *All Sampling Patterns* directory tree.



9-4-2 Deleting a Sampling Pattern

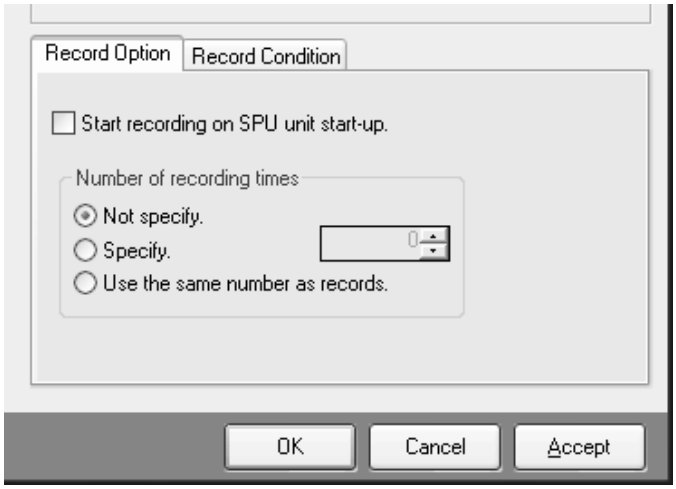
1,2,3...

1. To delete a sampling pattern, click the SPU Console's **Sampling Setting** Tab and select ***Collection Pattern Configuration***.
2. Select the sampling pattern to be deleted in the pane on the left side of the Sampling Configuration Dialog Box and click the **Remove** Button.



9-4-3 Specifying Record Options

The Sampling Configuration Dialog Box's Record Tab Page contains settings that can specify the number of samples (recording times) as well as whether or not sampling will start automatically when the SYSMAC SPU Unit starts operating.



Starting Sampling on SYSMAC SPU Unit Start-up

When the *Start recording on SYSMAC SPU Unit start-up Option* is selected, The sampling pattern will be started automatically when the SYSMAC SPU Unit starts operating.

Specifying the Number of Samples

Sampling can be stopped automatically when the specified number of samples have been recorded.

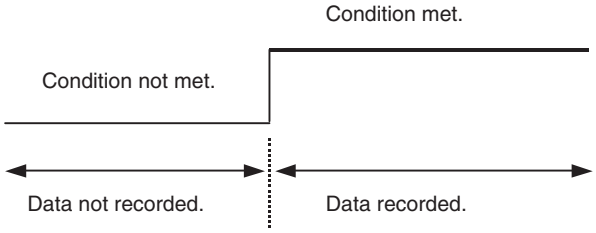
When *Not specify* is selected, sampling will continue.

When *Specify* is selected, sampling will stop automatically when the specified number of samples have been recorded.

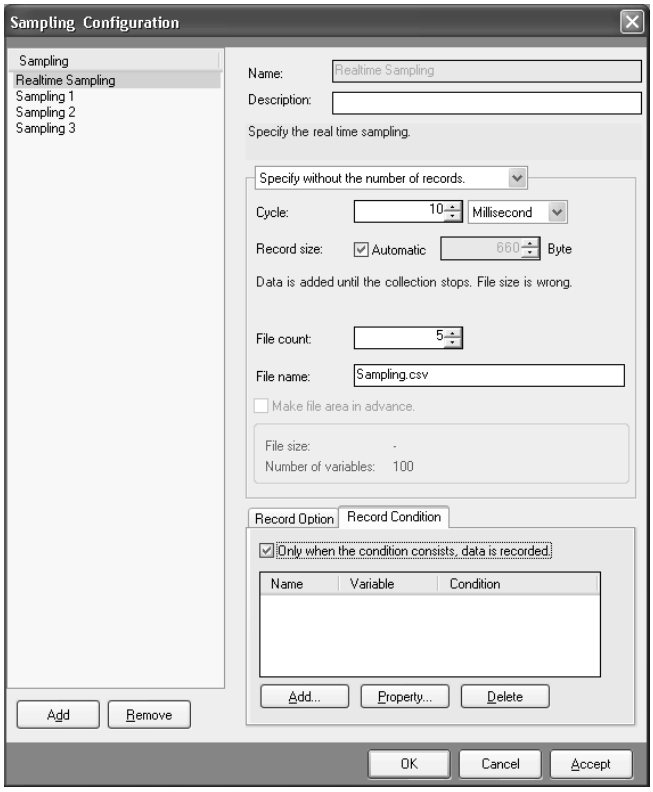
When *Use the same number as records* is selected, sampling will stop automatically when the number of recorded samples equals the number of records specified with the *Record count* setting.

9-4-4 Sampling Condition Designation

A sampling condition (*Record Condition*) can be set in advance so that data will be recorded only when the condition is met.



Conditions are set on the Sampling Condition Tab Page in the Sampling Properties Dialog Box.



Note If the *Only when the condition consists, data is recorded* Option is not selected, data will be recorded at each sampling cycle.

Adding Conditions

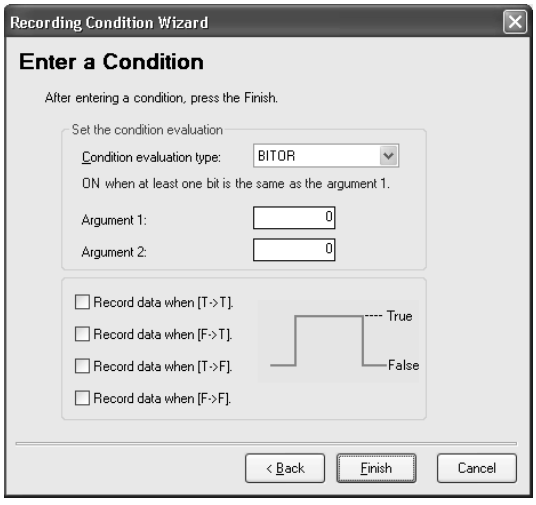
1,2,3... 1. Select the *Only when the condition consists, data is recorded* Option and then click the **Add** Button.

The Recording Condition Wizard shown in step 2 will be displayed.

2. Input the condition name and select the variable to use to set the condition. Input a text string for the condition name.

Note The variable used to set a condition must be registered in advance as a sampling variable.

3. Click the **Next** Button.



4. Input the condition and then click the **Finish** Button.

For *Set the condition evaluation*, set the condition evaluation type and arguments for comparison with memory contents. The following table shows the condition evaluation types and arguments.

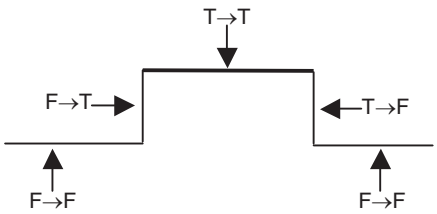
Condition evaluation type	Argument 1	Argument 2	Meaning
BITOR	Required	---	One of the same bits is ON as in argument 1.
BITAND	Required	---	All of the same bits are ON as in argument 1.
TRUE	---	---	Always true
NoneZero	---	---	Value ≠ 0
EQ	Required	---	Value = Argument 1
LT	Required	---	Value < Argument 1
LE	Required	---	Value ≤ Argument 1
GT	Required	---	Value > Argument 1
GE	Required	---	Value ≥ Argument 1
GELE	Required	Required	Argument 1 ≤ Value ≤ Argument 2
GTLT	Required	Required	Argument 1 < Value < Argument 2
GELT	Required	Required	Argument 1 ≤ Value < Argument 2
GTLE	Required	Required	Argument 1 < Value ≤ Argument 2
PrevBITOR	---	---	One of the same bits is ON as in previous value.
PrevBITAND	---	---	All of the same bits are ON as in previous value.
PrevEQ	---	---	Value = Previous value
PrevLT	---	---	Value < Previous value
PrevLE	---	---	Value ≤ Previous value
PrevGT	---	---	Value > Previous value
PrevGE	---	---	Value ≥ Previous value

---: Not required.

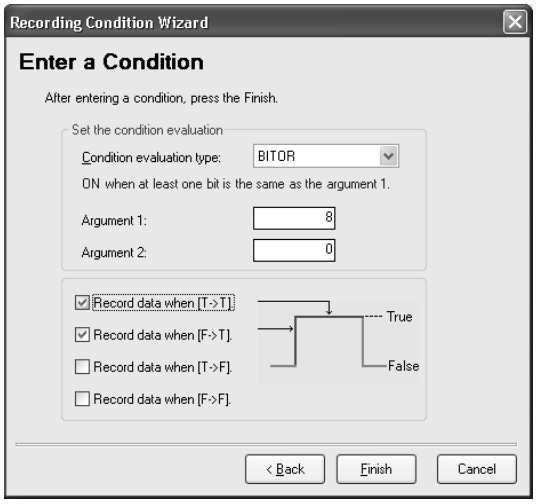
The pattern for which sampling data is to be recorded for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
True → True	Data is recorded when the evaluation remains true.
True → False	Data is recorded when the evaluation changes from true to false.
False → True	Data is recorded when the evaluation changes from false to true.
False → False	Data is recorded when the evaluation remains false.

The following diagram illustrates these settings.



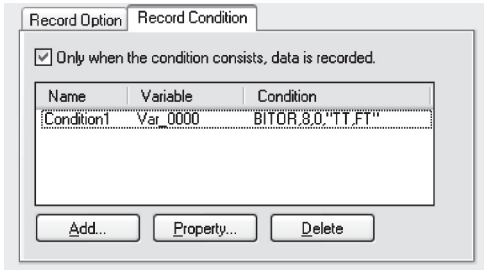
For example, the following settings are used to record data only when bit 4 is ON.



Note Evaluations are calculated based on the word contents of the address specified for the variable, not on the converted value for the data type of the variable.

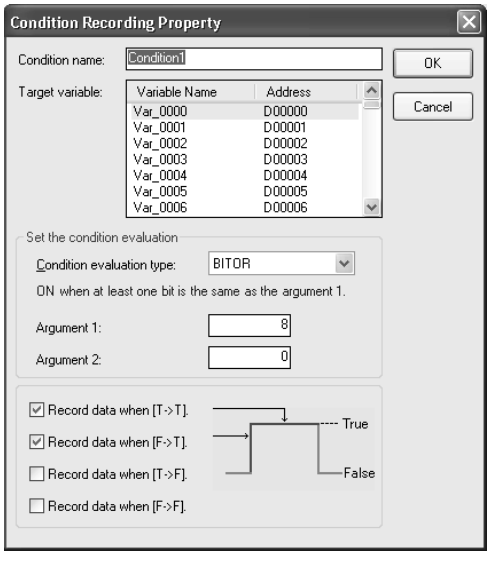
Deleting a Condition

To delete a condition, select the condition and click the **Delete** Button.



Changing a Condition

To change a condition, select the condition and click the **Property** Button.



9-5 Enabling the Sampling Settings

Use the following procedure to enable the sampling settings. Always perform this procedure after the sampling settings have been changed.

Note

(1) Confirm that the SYSMAC SPU Unit is connected before enabling the settings.

(2) When the changed settings are transferred, the existing SYSMAC SPU Unit settings will be overwritten.

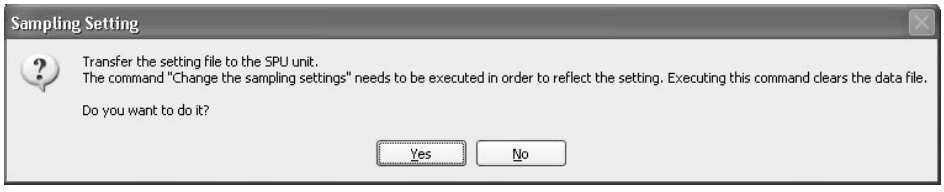
(3) Never turn OFF the Unit's power supply while the Unit's settings are being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.

(4) If too many variables are registered in the sampling pattern, the settings may not be transferred correctly. In this situation, reduce the number of variables and re-transfer the settings.

1,2,3...

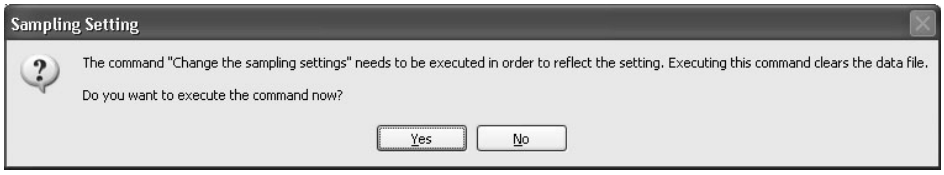
1. Confirm that variable settings and sampling pattern settings have been completed.
2. Click the SPU Console's **Sampling Setting** Tab.
3. Click the **Transfer to Unit** Button in the SPU-Console's *Control Panel*.

   The following dialog box will be displayed to confirm the transfer.



4. Click the **Yes** Button to proceed with the transfer.

   A dialog box will be displayed to indicate that the data is being transferred and then the following dialog box will be displayed to confirm that the SYSMAC SPU Unit's sampling settings will be changed.



5. Click the **Yes** Button to change the sampling settings.

   The SYSMAC SPU Unit's 7-segment display will read "P1" through "PE" while the sampling settings are being changed. The display will return to "-S" when the change is completed. The new settings will be effective when the "-S" display appears.

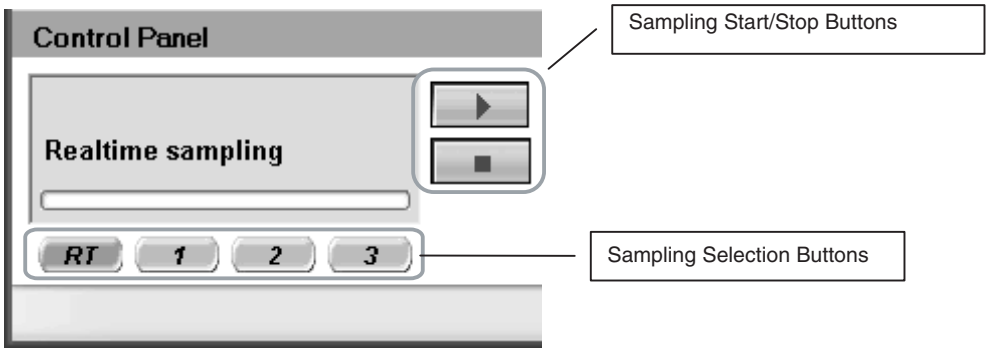
9-6 Executing Sampling

This section describes how to start and stop sampling from the SPU-Console.

9-6-1 Controlling Sampling

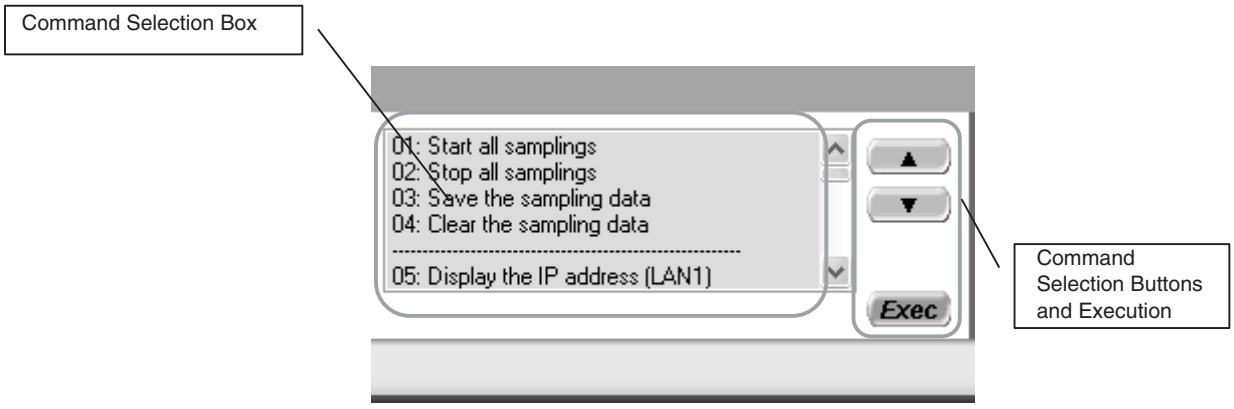
Sampling is started by clicking a Sampling Selection Button and then clicking the Sampling Start Button.

Sampling is stopped by clicking the Sampling Stop Button.



9-6-2 Controlling All Sampling

To start all sampling at the same time, select ***01: Start all samplings*** from the Command Selection Box and then click the **Exec** Button. To stop all sampling at the same time, select ***02: Stop all samplings*** and then click the **Exec** Button.



Alternately, select ***Start All the Samplings*** or ***Stop All the Samplings*** from the Command Menu.

Note

(1) To start sampling automatically when the SYSMAC SPU Unit is started, select the *Start recording on SYSMAC SPU Unit start-up* Option in the Sampling Tab Page's Sampling Configuration Dialog Box.

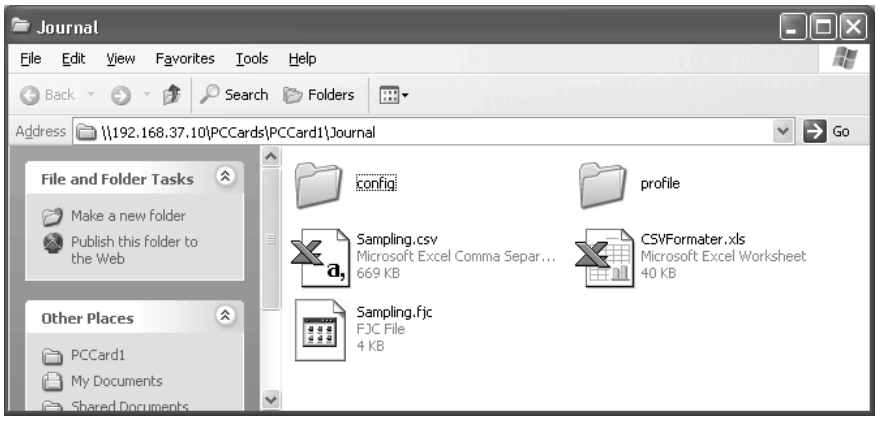
(2) As long as I/O memory can be read from the CPU Unit, sampling will be performed by the SYSMAC SPU Unit regardless of the status of the CPU Unit, even for fatal errors and load OFF status.

9-7 Displaying the Sampling Result Folder

The sampling files can be accessed from the computer by using a shared folder on a Windows network. Here, an example using Microsoft Excel is described. In this example, it is assumed that Excel is already installed and that CSV files are associated with it.

1,2,3... 1. Select ***View - Display the Unit Folder*** from the SPU-Console menus.

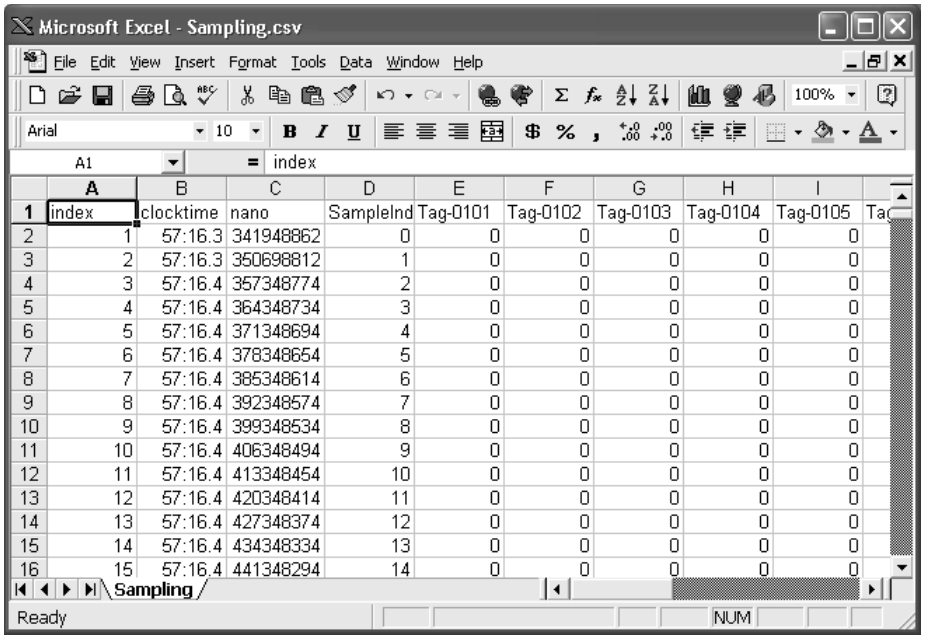
Explorer will be started and the folder containing the sampling results will be displayed.



2. Double-click the sampling file to display.

Excel will be started and the contents of the sampling file will be displayed.

If the CSV file extension is associated with an application other than Excel, the associated application will be started.



	A	B	C	D	E	F	G	H	I
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105
2	1	57:16.3	341948862	0	0	0	0	0	0
3	2	57:16.3	350698812	1	0	0	0	0	0
4	3	57:16.4	357348774	2	0	0	0	0	0
5	4	57:16.4	364348734	3	0	0	0	0	0
6	5	57:16.4	371348694	4	0	0	0	0	0
7	6	57:16.4	378348654	5	0	0	0	0	0
8	7	57:16.4	385348614	6	0	0	0	0	0
9	8	57:16.4	392348574	7	0	0	0	0	0
10	9	57:16.4	399348534	8	0	0	0	0	0
11	10	57:16.4	406348494	9	0	0	0	0	0
12	11	57:16.4	413348454	10	0	0	0	0	0
13	12	57:16.4	420348414	11	0	0	0	0	0
14	13	57:16.4	427348374	12	0	0	0	0	0
15	14	57:16.4	434348334	13	0	0	0	0	0
16	15	57:16.4	441348294	14	0	0	0	0	0

Note When displaying sampling files with Excel, the Excel macro CSVFormatter.xls is used, e.g., to display time stamps in a more readable form.

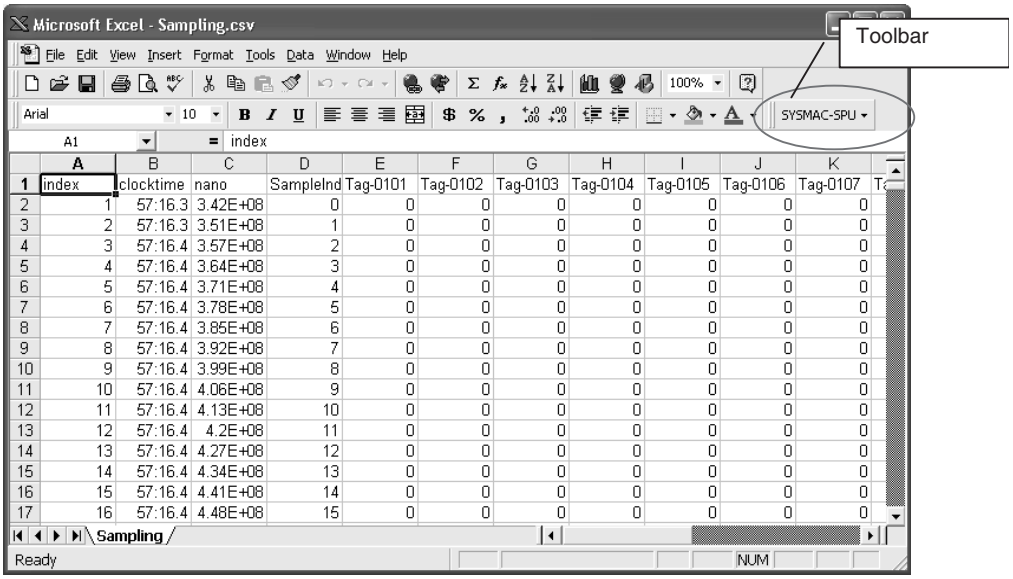
This macro can be used for the following.

(1) Organize the Excel display of the sampling file contents, e.g., make the time field easier to read.

(2) Calculate the difference in time between records and display it in an Excel column (column heading: diff[ms]). This can be used to evaluate the difference in the sampling cycle that was set and the actual sampling behavior of the SYSMAC SPU Unit.

The CSVFormatter.xls macro is used as follows:

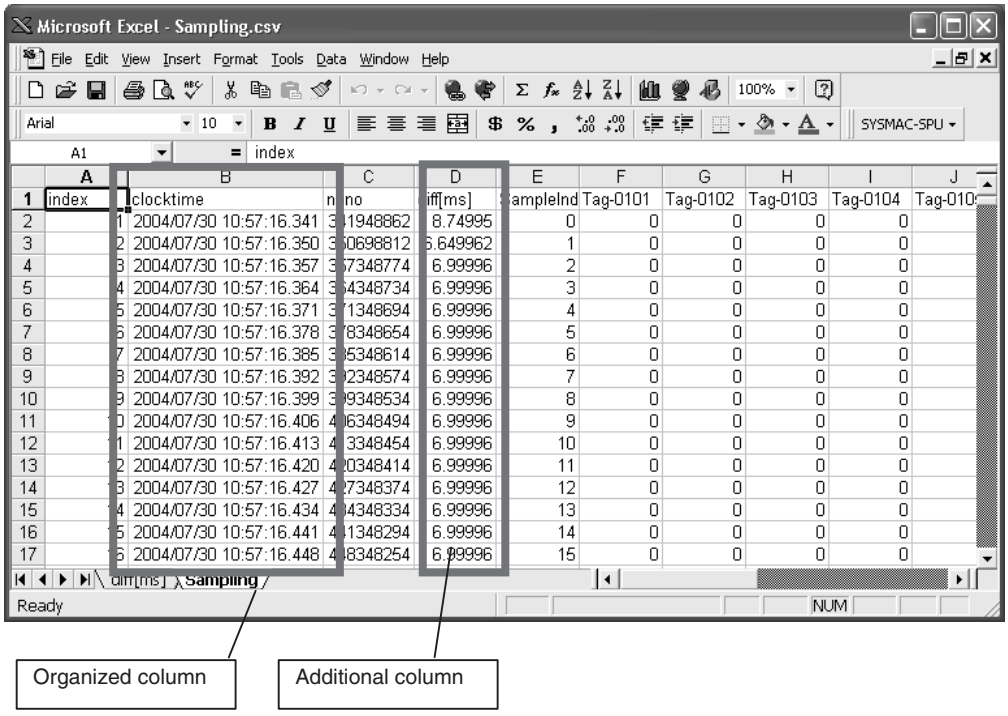
1,2,3... 1. Double-click the CSVFormatter.xls file in the Journal folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a toolbar called SYSMAC-SPU to the Excel toolbars.
It may not be possible to execute this macro depending on the settings of Excel security. If the macro cannot be executed, select ***Options - Macro Security - Security Level*** from the Excel menus and set the security level to ***Medium.***



	A	B	C	D	E	F	G	H	I	J	K
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105	Tag-0106	Tag-0107
2	1	57:16.3	3.42E+08	0	0	0	0	0	0	0	0
3	2	57:16.3	3.51E+08	1	0	0	0	0	0	0	0
4	3	57:16.4	3.57E+08	2	0	0	0	0	0	0	0
5	4	57:16.4	3.64E+08	3	0	0	0	0	0	0	0
6	5	57:16.4	3.71E+08	4	0	0	0	0	0	0	0
7	6	57:16.4	3.78E+08	5	0	0	0	0	0	0	0
8	7	57:16.4	3.85E+08	6	0	0	0	0	0	0	0
9	8	57:16.4	3.92E+08	7	0	0	0	0	0	0	0
10	9	57:16.4	3.99E+08	8	0	0	0	0	0	0	0
11	10	57:16.4	4.06E+08	9	0	0	0	0	0	0	0
12	11	57:16.4	4.13E+08	10	0	0	0	0	0	0	0
13	12	57:16.4	4.2E+08	11	0	0	0	0	0	0	0
14	13	57:16.4	4.27E+08	12	0	0	0	0	0	0	0
15	14	57:16.4	4.34E+08	13	0	0	0	0	0	0	0
16	15	57:16.4	4.41E+08	14	0	0	0	0	0	0	0
17	16	57:16.4	4.48E+08	15	0	0	0	0	0	0	0

2. Click the **SYSMAC-SPU** Button on the toolbar and select ***Formatting.***

After this procedure is performed, the time display will be organized and the *diff[ms]* column will be displayed as shown below.



9-8 Saving Sampling Data

Sampling data collected by the SYSMAC SPU Unit can be saved in one file. The file will contain the sampling settings, all sampling files, and the SYSMAC SPU Unit operating status in a compressed format. This file can be used to save specific sampling results.

- Save the data to a file by executing command 03 (Save the Sampling Data).
- The file will be saved in the SYSMAC SPU Unit network-shared folder \pccards\PCCard1\Archive with a timestamp for a name and the file name extension tgz (example: 20040727150505.tgz).
- The file that is saved is in tar and gzip format.
- The files inside the saved file can be accessed with the functions of Windows XP. With Windows 2000, compression software, such as WinZip, is required to unpack the files.

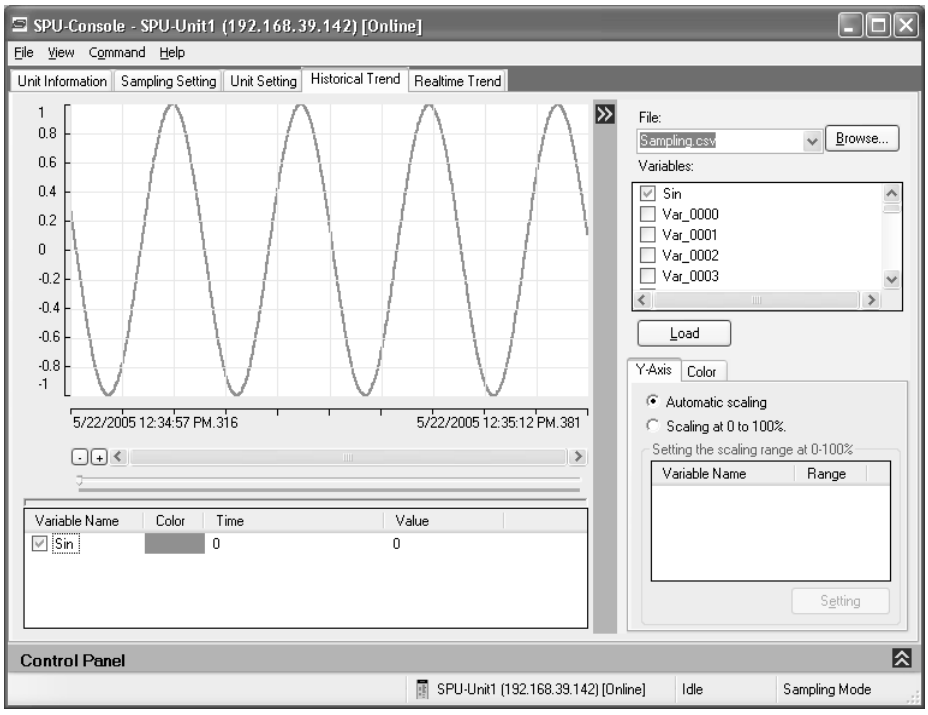
Note When command 03 (Save the Sampling Data) is executed on the SYSMAC SPU Unit, a temporary file is created when creating the file to save. Saving the file may fail if there is not sufficient memory on the PC card.
As a guide, available space will be required that is equivalent to the total size of all of the sampling files.

SECTION 10
Trend Graphs

This section describes how to display trend graphs based on sampling files that have been collected.

10-1 Historical Trends

An historical trend graph, such as the one shown below, can be displayed based on a sampling file.



10-1-1 Displaying Historical Trends

1,2,3...

1. Click the **Historical Trend** Tab on the SPU-Console.
2. Select the sampling data to display in the *File* Field.

   Click the **Browse** Button and browse through the file directories and specify the sampling file.
3. Select the variables to display in the Variables Field.
4. Click the **Load** Button.

10-1-2 Specifying the Y Axis Scale

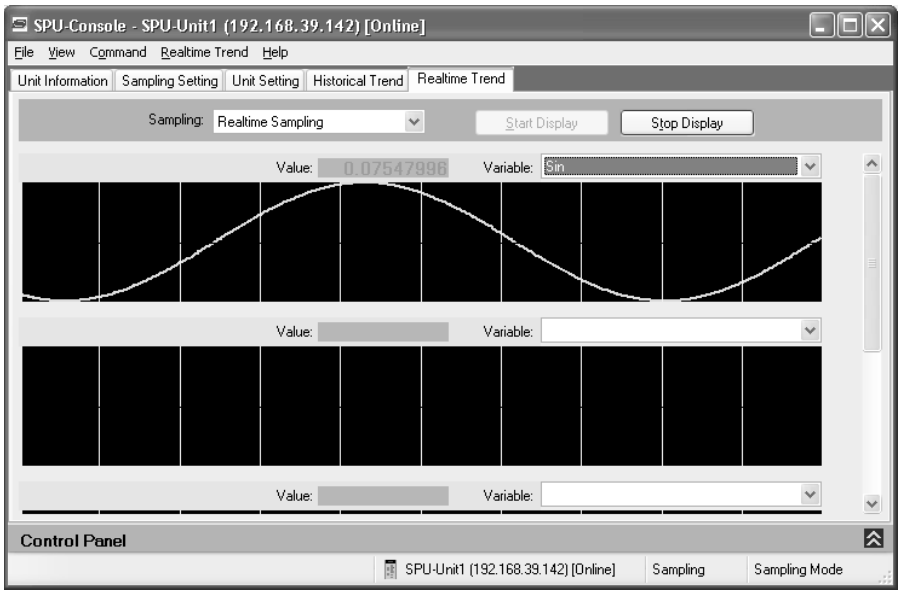
The scale of the Y axis can be specified on the Y-Axis Tab Page. If *Automatic scaling* is selected, the maximum and minimum values of the displayed variable will be used as the maximum and minimum values of the Y axis.

If *Scaling at 0 to 100%* is selected, the maximum and minimum values of the displayed variable will be converted to 0% and 100% on the display.

The maximum and minimum values of the variable to use for scale conversion can also be specified. After first loading the variable, select the variable under *Scaling at 0 to 100%* and click the **Setting** Button.

10-2 Realtime Trends

The data currently being sampled can be display in realtime on a trend graph.



10-2-1 Displaying Realtime Trends

1,2,3...

1. Click the **Realtime Trend** Tab on the SPU-Console.
2. Select the sampling pattern to display in the Sampling Field.
3. Select the variable to display in the Variable Field.
4. Click the **Start Display** Button.

10-2-2 Stopping Realtime Trends

Click the **Stop Display** Button. The realtime trend display will stop.

⚠ **Caution** The realtime trend graph displays the status of sampling executed by the SYSMAC SPU Unit. Do not use the realtime trend display as a basis for control or judgments.
The SYSMAC SPU Unit transfers sampled data in realtime, sometimes at intervals of only a few milliseconds, and it may not be possible to display all sampling data depending on the operating environment of the SPU-Console.

SECTION 11
Unit Settings

This section describes how to set the system settings and FINS network settings.

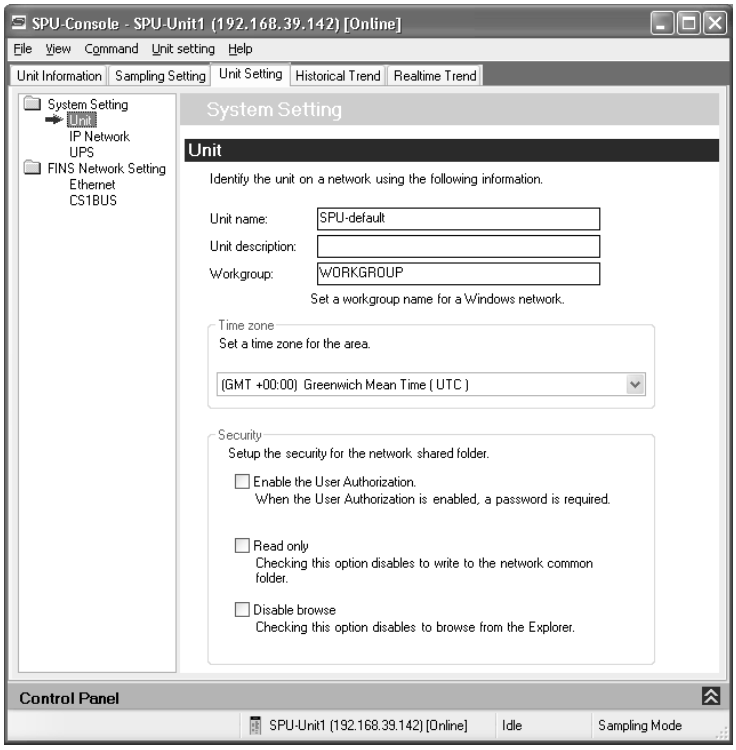
11-1 System Settings

The System Setting Panel on the Unit Setting Tab Page is used to set the Unit name, IP address, and power failure input (PF-IN) shutdown.

Note Confirm that the destination SYSMAC SPU Unit is connected before making the settings.

11-1-1 Unit Settings

Select ***System Setting - Unit*** on the Unit Setting Tab Page.



The following settings can be made.

Item	Meaning
Unit name	This is the name displayed under My Networks on the Windows computer. Input an alphanumeric name with a maximum of 65 characters. Set a unique name for each SYSMAC SPU Unit connected to the same network.
Unit description	A description of the SYSMAC SPU Unit. The description may be omitted.
Workgroup	The workgroup name on the Windows network.
Time zone	Set the SYSMAC SPU Unit's time zone. The SYSMAC SPU Unit is factory set to UTC (Coordinated Universal Time). Always adjust the clock to the local time zone.
Security	Sets the security level for shared network folders.

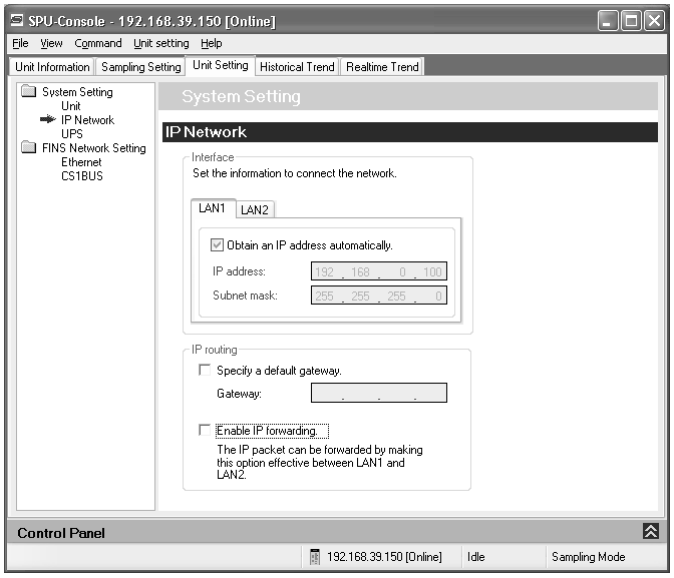
Note If *Enable the User Authorization* is selected, the SPU-Console may fail to connect to the SYSMAC SPU Unit, e.g., an error message saying the network path cannot be found may be displayed. If this happens, connect the SPU-Console to the SYSMAC SPU Unit using the following procedure.

1,2,3...

1. Exit the SPU-Console.
2. Access the SYSMAC SPU Unit's shared network folder from Windows Explorer. Input *root* (all lower case) as the user name and *OMRON* (all upper case) as the password.
3. Confirm that the SYSMAC SPU Unit folder is displayed in the network-shared folders.
4. Start the SPU-Console and connect to the SYSMAC SPU Unit.

11-1-2 IP Network Settings

Select ***System Setting - IP Network*** on the Unit Setting Tab Page.



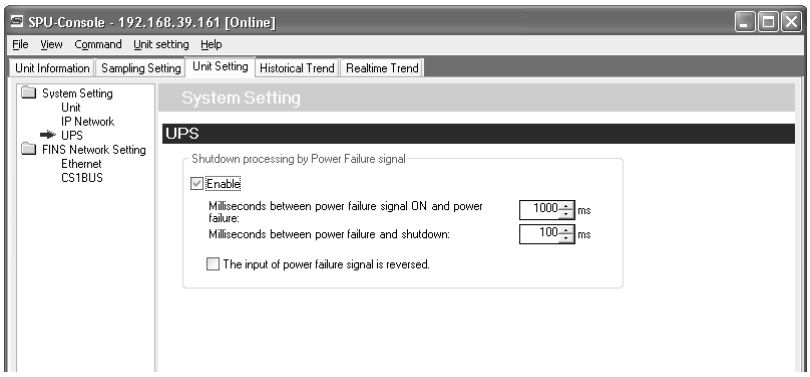
The following settings can be made.

Item	Meaning
Obtain an IP address automatically.	Select this setting to automatically obtain an IP address using the DHCP (Dynamic Host Configuration Protocol). **Note** A DHCP server must exist on the network/system to use this setting. If you do not know if a DHCP server exists, ask your system administrator.
IP address	Input the IP address. Set a unique IP address for each SYSMAC SPU Unit connected to the same network.
Subnet mask	Set the same subnet mask as the one set on the network computer to be connected.
IP routing	Set the default gateway and IP forwarding to use for IP packet routing. **Note** The IP forwarding setting is supported for CS1W-SPU02 SYSMAC SPU Units only.

Note For the CS1W-SPU02, an IP address can also be set for LAN2. If an IP address is set for LAN2, use different network addresses for LAN1 and LAN2. If the same network address is used, correct communications may not be possible.

11-1-3 Shutdown Setting for the Power Failure Input

Select ***System Setting - UPS*** on the Unit Setting Tab Page.



The following settings can be made.

Item	Meaning
Enable	Select this option to enable the SYSMAC SPU Unit shutdown function when the power failure signal is detected from the uninterruptible power supply (UPS).
Milliseconds between power failure signal ON and power failure	Specify the time in millimeters between when the power failure signal turns ON and a power failure is assumed. Determine this value based on factors such as the backup time of the UPS.
Milliseconds between power failure and shutdown	Specify the time in milliseconds between assuming a power failure (i.e., after the power failure signal has remained ON for the specified time) and starting execution of the shutdown process.
The input of the power failure signal is reversed.	A power failure is detected when the power failure signal is OFF (negative logic). The SYSMAC SPU Unit is factory set to detect a power failure when the power failure signal goes ON.

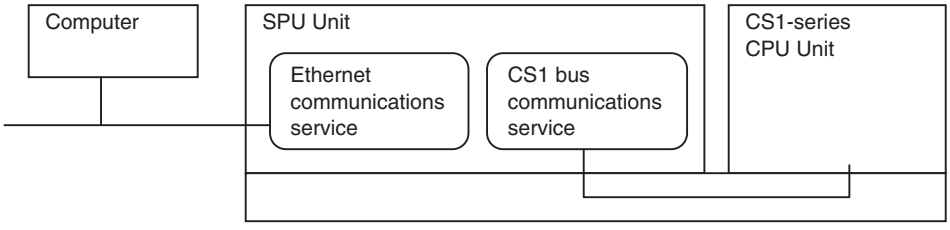
Note

(1) The SYSMAC SPU Unit will execute shutdown processing after it has assumed a power interruption even if the power failure signal turns OFF. The SYSMAC SPU Unit will also not restart automatically once a shutdown has been executed even if the power failure signal turns OFF. Confirm that the power supply has been restored and then restart the SYSMAC SPU Unit.

(2) With CS-series SYSMAC SPU Units, the power failure signal is connected to the PF-IN terminal. With CJ-series SYSMAC SPU Units, the power failure signal is connected to the COMM port.

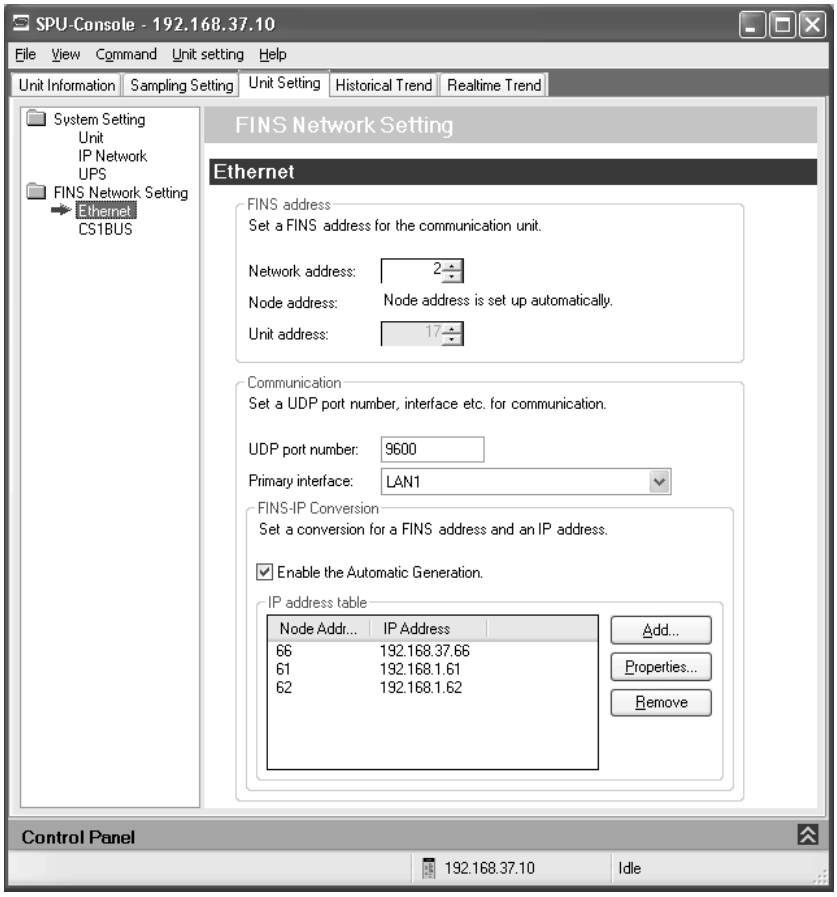
11-2 FINS Network Settings

The SYSMAC SPU Unit contains OMRON'S FinsGateway communications middleware, enabling it to use FINS messages. FINS network settings are made on the FINS Network Setting Panel of the Unit Setting Tab Page.



11-2-1 Ethernet Settings

Select ***FINS Network Setting - Ethernet*** on the Unit Setting Tab Page.



Note Set the same Ethernet network address for the FinsGateway on the computer and in the SYSMAC SPU Unit.

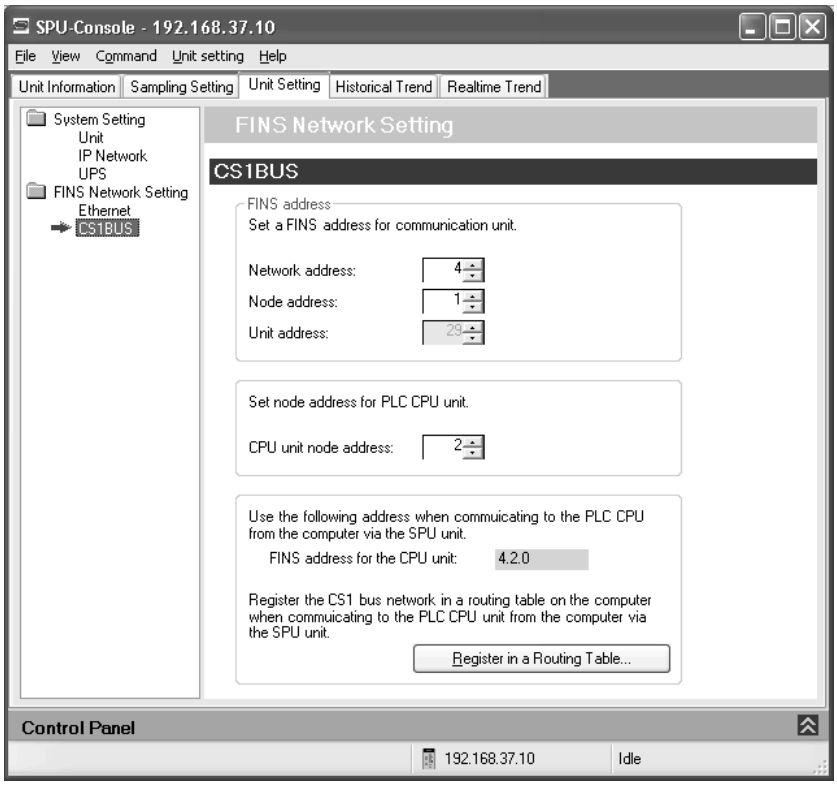
The following settings can be made.

Item	Meaning
FINS address	The FINS address of the Ethernet Communications Unit. If the IP address is obtained automatically, the node address will be automatically set to the rightmost byte of the IP host segment. The unit address cannot be changed.
UDP port number	Set the UDP port number to execute the FINS communications service. The default setting is 9600.
Primary interface	Specify LAN1.
FINS-IP Conversion	Specify the method to use to convert the FINS node address to an IP address. If *Enable the Automatic Generation* is selected, the FINS node address will be used unaltered as the rightmost byte of the host segment when converting. If a node address is registered in IP address table (which shows the corresponding IP addresses and FINS node addresses), the IP address table will be given priority. If *Enable the Automatic Generation* is not selected, only the IP address table will be used for conversion.

11-2-2 CS1 Bus Settings

The CS1 bus communications service uses the CS1 bus as a network to communicate with the CPU Unit.

1,2,3... 1. Select ***FINS Network Setting - CS1 Bus*** on the Unit Setting Tab Page.



The following settings can be made.

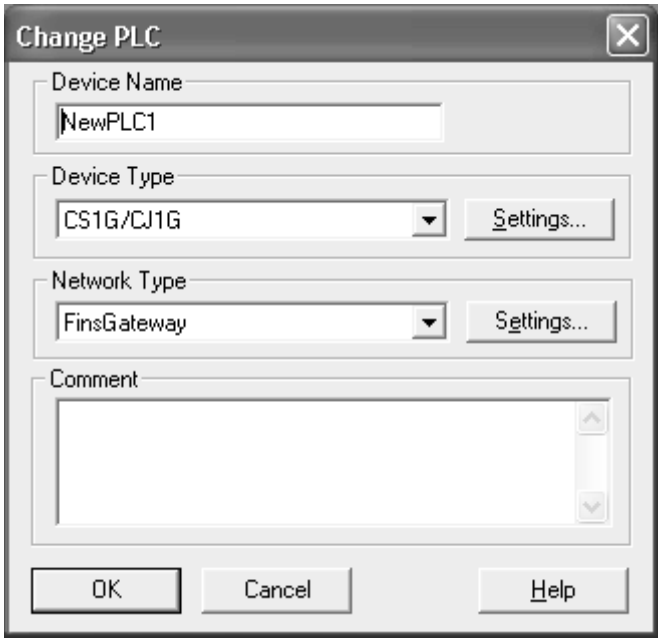
Item	Meaning
FINS address	The FINS address of the CS1 Bus Communications Unit. The unit address cannot be changed.
CPU unit node address	Set the FINS node address for the CPU Unit of the PLC, which will be treated as a node.

To communicate with the CPU Unit from the computer through the SYSMAC SPU Unit, the CS1 bus network must be registered in the routing tables in the computer.

Click the **Register in a Routing Table** Button to register the CS1 bus in the routing tables on the computer.

Note If the **Register in a Routing Table** Button is clicked, applications using FinsGateway on the computer can use the address set for the *FINS address for the CPU unit* to perform FINS message communications with the CPU Unit via the SYSMAC SPU Unit. (The operation of the application, however, cannot be assured by the SYSMAC SPU Unit.)
For example, with the CX-Programmer, set the network type to FinsGateway, set the FINS destination address in the network settings to the CPU Unit FINS address displayed on the SPU-Console, and set the frame length to 1900. This will enable using the CX-Programmer to operate the CPU Unit via the SYSMAC SPU Unit.

CX-Programmer's Change PLC Dialog Box



CPU Unit Routing Tables

- When communicating with the CPU Unit in the PLC, there is no need to register the SYSMAC SPU Unit in the local network table.
- When communicating with another network via the CPU Unit in the PLC, the SYSMAC SPU Unit's CS1 bus network address must be registered in the local network table.
- CPU Unit routing tables are created using the CX-Integrator. For details on operating the CX-Integrator, refer to the *CX-Integrator Operation Manual*.

11-3 Enabling Changes in Unit Settings

This section describes the procedure used to enable changes in unit settings. Always perform this procedure when changing unit settings.

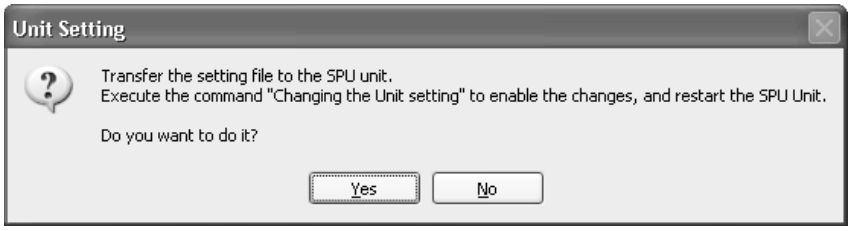
Note

- Confirm that the destination SYSMAC SPU Unit is connected before starting a transfer.
- Do not turn OFF the power supply to the PLC while an SYSMAC SPU Unit settings file is being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.

1,2,3...

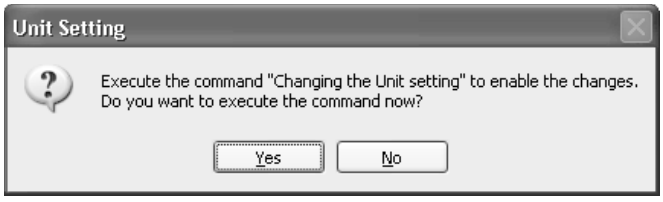
1. Confirm that the unit settings have been completed.
2. Click the SPU Console's **Unit Setting** Tab.
3. Click the **Transfer to Unit** Button in the SPU-Console's *Control Panel*.

   The following dialog box will be displayed to confirm the transfer.



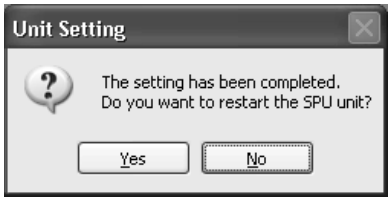
4. Click the **Yes** Button to proceed with the transfer.

   A dialog box will be displayed to indicate that the data is being transferred and then the following dialog box will be displayed to confirm that the SYSMAC SPU Unit's unit settings will be changed.



5. Click the **Yes** Button to change the unit settings.

   The SYSMAC SPU Unit's 7-segment display will read "U1" through "UE" while the unit settings are being changed. When the change has been completed, the following dialog box will be displayed to restart the SYSMAC SPU Unit.



6. To restart the SYSMAC SPU Unit, click the **Yes** Button.

Note

(1) Once the SYSMAC SPU Unit has been restarted, the method given in *11-4 Undoing Changes in Unit Settings* cannot be used to undo changes.

(2) If the unit name or IP address are changed, select ***File - Disconnect*** and disconnect from the SYSMAC SPU Unit. Then reconnect to the SYSMAC SPU Unit using the new unit name or IP address.

11-4 Undoing Changes in Unit Settings

The following procedure can be used to undo changes made in the unit settings.

Select ***25: Undo the unit setting changes*** from the Command Selection Box in the Remote Console and then click the **Exec** Button.

If the SYSMAC SPU Unit cannot be connected to because the unit name or IP address has been changed, execute the *25: Undo the unit setting changes* command from the SYSMAC SPU Unit.

Note Once the SYSMAC SPU Unit has been restarted, the above method cannot be used to undo the changes.

SECTION 12
Supported Commands

This section provides a list of the commands that can be executed for SYSMAC SPU Units.

12-1 Commands

Commands can be executed from the SYSMAC SPU Unit, the SPU-Console, or the ladder program. For details on executing commands, refer to *SECTION 6 Executing Commands*.

The commands supported by the SYSMAC SPU Unit differ slightly in the SYSMAC SPU Unit's two operating modes. The following commands are supported.

Command No.	Command	Meaning
01	Start all samplings	Starts all sampling that has been set.
02	Stop all samplings	Stops all sampling that has been set.
03	Save the sampling data	Saves the sampling files and settings file in zip format.
04	Clear the sampling data	Deletes all of the sampling files.
05	Display the IP address (LAN1)	Displays the IP address of LAN1 on the 7-segment display.
06	Display the IP address (LAN2)	Displays the IP address of LAN2 on the 7-segment display.
07	Display the unit name	Displays unit name on the 7-segment display.
08	Display the FINS address	Displays the FINS address of the Ethernet Communications Unit on the 7-segment display.
09	Display of PC card used space (%)	Displays the percentage of the PC card that has been used.
10	Error display	Displays any current error.
11	Forced clear of error	Deletes the record of any current errors.
12	Restart unit	Restarts the SYSMAC SPU Unit.
20	Change the sampling settings	Changes the sampling settings.
21	Back up the sampling settings	Backs up the sampling settings. This command must be used first to enable using the *Recover the sampling settings* command.
22	Recover the sampling settings	Restores the sampling settings that were backed up.
24	Change the unit settings	Changes the unit settings.
25	Undo the unit setting changes	Undoes changes to the unit settings.
30	Start the serial terminal	Used for maintenance. Do not execute this command.
31	Format the PC card (FAT32)	Formats the PC card in FAT32 format. All the files in the PC card will be deleted.
32	Clear the Logfile	Deletes the system log. Used for maintenance.
33	Processing information record	Used for maintenance. Do not execute this command.
50 to 57	Start/stop realtime sampling, sampling 1, sampling 2, or sampling 3	Starts or stops the specified sampling.
90 to 99	Execute the external command (90 to 99)	Executes the file SpuCommand<*No.*>.sh in the PC card if the file exists. This command is for maintenance purposes.

SECTION 13
Data Storage Mode

This section introduces the SYSMAC SPU Unit's Data Storage Mode.

The following sections provide information on the SPU-Console operation methods when using the SYSMAC SPU Unit's Data Storage Mode.
For information on methods used to check whether the SYSMAC SPU Unit is operating in Data Storage Mode, refer to *4-2 Confirming the Operating Mode*. For information on changing the SYSMAC SPU Unit's operating mode to Data Storage Mode, refer to *4-3 Changing the Operating Mode*.

13-1 Data Storage Mode Introduction

Data Storage Mode is used to record specific portions of PLC I/O memory when a specified event occurs. For example, this mode can be used to record data when a certain bit turns ON or at a certain time. After an event occurs, data recording can be continued for a specified time interval. Compared with Sampling Mode, however, the time interval is less accurate.

The Data Storage Mode settings set the data in the CPU Unit's I/O memory to be collected by the SYSMAC SPU Unit and the collection method to be used.

The data to be collected is specified in units called variables. The PLC's I/O memory addresses and data types are specified in the variables. Data is converted to the specified data type values and recorded. Scale conversion of these values is also possible.

Data collection patterns consist of basic collection for single data, and data collection for multiple data (64 max.). For each data collection pattern, the length of the data collection time interval, number of records, name of the file to be saved, and whether a single file or multiple files are to be used (saving format) are specified.

The event settings that specify the time for data collection to start are also set. Events are either memory events, which occur when specific conditions are satisfied by values in memory, and schedule events, which occur at specific times or time intervals. The combination of these events with the processing that is performed when the events occur are called event rules. Event rules such as "data is recorded in a CSV file whenever a certain bit turns ON" or "data is recorded in a CSV file every data at 8:00" can be set.

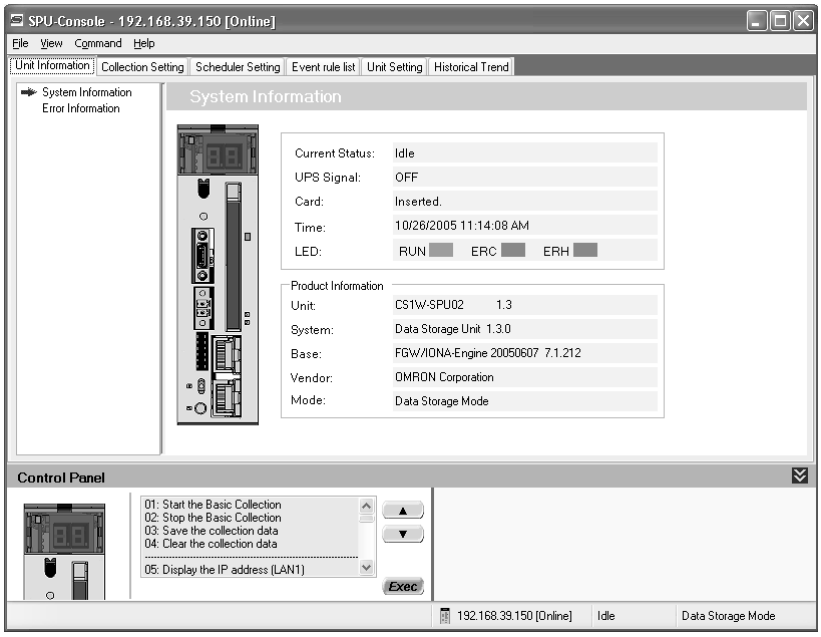
Of the available data collection patterns, only basic collection will read PLC I/O memory data in the CPU Unit. Basic collection reads to the SYSMAC SPU Unit variable data recorded in all data collection patterns for a specific cycle. Other data collection patterns use data read to the SYSMAC SPU Unit and record that data according to the settings. Basic collection enables a time interval to be set of between several milliseconds to several ten's of milliseconds, whereas the time interval for other data collection patterns is normally 100 milliseconds or longer.

SECTION 14
Monitoring SYSMAC SPU Unit Operating Status

This section describes how to monitor SYSMAC SPU Unit operating status and error status.

14-1 Displaying System Information

The operating status of an SYSMAC SPU Unit can be monitored from the System Information display on the Unit Information Tab Page.



System Information Display Items

Item	Content
Current Status	Operating status of the current SYSMAC SPU Unit
PF-IN Signal	Status of the power failure signal
PC Card	Whether a PC card is inserted in the SYSMAC SPU Unit
Time	The time in the SYSMAC SPU Unit
LED	The status of the RUN, ERC, and ERH indicators
Product Information	The SYSMAC SPU Unit model number and system program version

Current Status

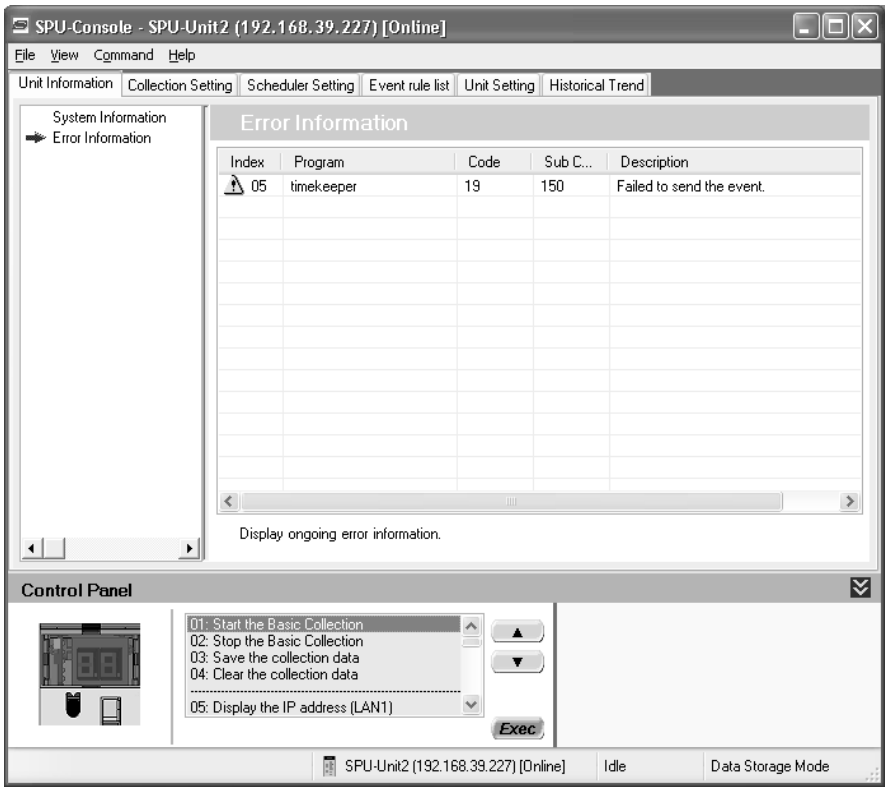
The SYSMAC SPU Unit current status contains the following status.

Status	Meaning
Idle	SYSMAC SPU Unit is in idle status.
Collecting	Basic collection is being performed.
Change the settings	Data collection settings or Unit settings are being changed.
Archive	Record data is being saved or data collection settings are being recovered.
Initialization	The SYSMAC SPU Unit is being initialized.

14-2 Displaying Error Information

The error status of an SYSMAC SPU Unit can be monitored from the Error Information Window on the Unit Information Tab Page.

Refer to *Appendix A Troubleshooting with Error Codes* for details on error codes.



Note Error information is deleted in the following cases.

(1) When the SYSMAC SPU Unit is restarted

(2) When errors are eliminated

(3) When data collection settings or unit settings are made

(4) When command 11 (Forced Clear of Error) is executed

SECTION 15
Data Collection Settings for Data Storage Mode

This section explains how to make the data collection settings for Data Storage Mode operation.

15-1 Data Collection Setting Procedure

An outline of the basic procedure from making data collection settings to executing data collection is as follows:

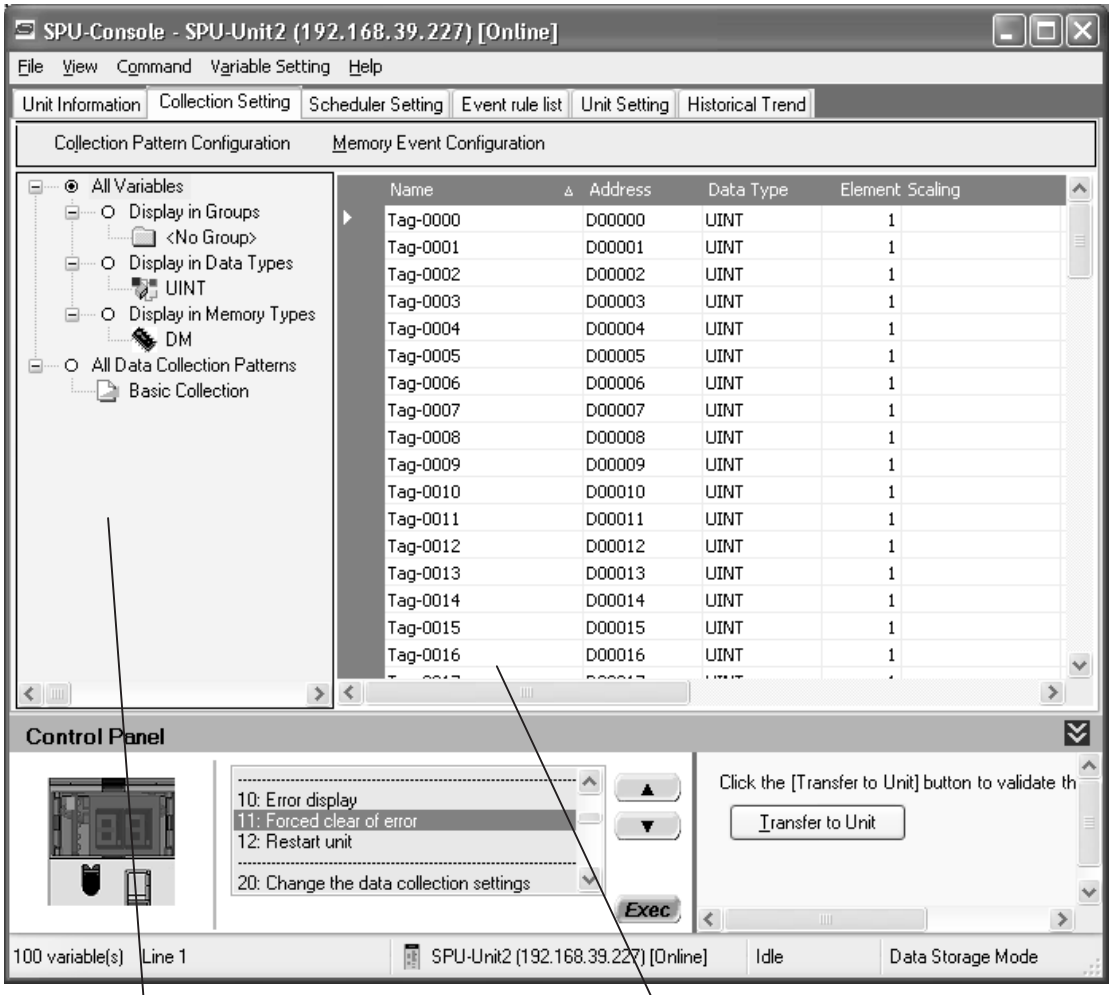
1,2,3...

1. Make the variable and data collection pattern settings.
2. Set the events.
3. Enable the settings in the SYSMAC SPU Unit.
4. Execute data collection.
5. Display the data collection results folder.

15-2 Data Collection Settings Window and Operation

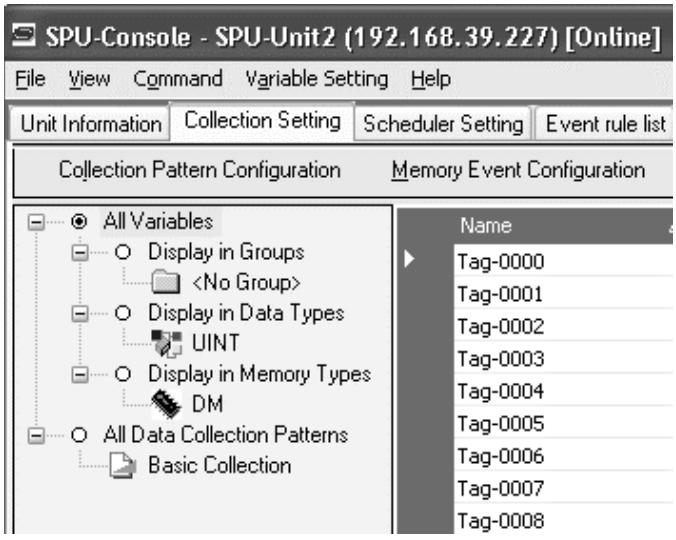
15-2-1 Window Configuration

Select the **Collection Setting** Tab in SPU-Console to display the setting window for data collection.



15-2-2 Operations in the Classification Panel

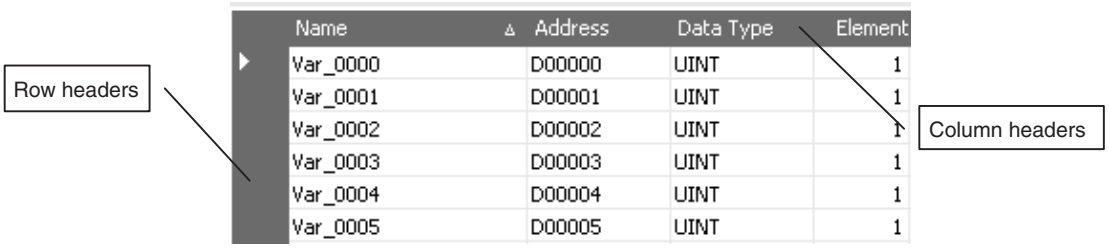
The following table explains the basic operations in the Classification Panel.



Item		Operation method and function
All Variables		If this option is selected, all of the set variables will be displayed.
	Display in Groups	When variables have been grouped, this option can be selected to organize and display the variables by group.
	Display in Data Types	If this option is selected, variables will be organized and displayed by data type, such as UINT and REAL.
	Display in Memory Types	If this option is selected, variables will be organized and displayed by the variables' data area addresses, such as DM.
All data collection patterns		If this option is selected, all of the collection pattern information will be displayed.
	Data collection patterns	If this option is selected, the variables for which data collection is to be performed will be displayed. For example, if variable X is displayed under *Basic Collection*, variable X will be recorded using *Basic Collection*.

15-2-3 Basic Operations in the Variable Panel

This section describes the name and meaning of each part of the Variable Panel.



The following table describes the columns.

Column	Meaning
Name	Shows the variable's name.
Address	Shows the variable's I/O memory address in the PLC.
Data Type	Shows the variable's data type. Data from the PLC's I/O memory is converted to this data type and recorded.
Element Scaling	Specifies the number of elements in array-type data. When the number of elements is 1, the data is not an array.
Engineering	Specifies the industrial units as the user-set text string.
Data Collection Pattern	Specifies the data collection pattern in which this variable is recorded.
Description	Shows a user-set description of the variable.

The following basic operations can be performed in the Variable Panel.

Changing the Name, Number of Elements, Units, or Description

Click the cell to be changed and directly input the new text.

Changing the Address

Select the cell to be changed, click the **...** Button, input the new address in the displayed window, and click the **OK** Button. The new address can also be input directly in the cell as a text input.

Changing the Data Type

Select the cell to be changed and select the new data type from the displayed drop-down list.

Changing the Data Collection Pattern

Select the cell to be changed, click the **...** Button to display the dialog box, and select (check) the data collection patterns used for collecting data for the selected variable.

Selecting Variables

Selecting a Single Variable

Click the desired variable's row header cell.

Selecting Multiple Variables

Press and hold the **Ctrl** Key while clicking the row header cells of multiple variables.

Selecting a Range of Consecutive Variables

Click the first variable's row header cell. Press the **Shift** Key while and click the last variable's row header cell.

Selecting All Variables

Press the **Ctrl+A** Keys.

Note When using Windows XP, the menu displayed when you right-click on the Variable Panel will include *Insert Unicode control character*, but this command cannot be used.

15-3 Setting Variables

The data to be sampled is specified with variables. Before collection, register each variable with the desired variable name, CPU Unit address, data type, and number of elements. Set the variables in the Variable Panel.

The variables can also be set with OMRON's CX-Programmer Support Software (version 2.0 or later) on the Variable Tab Page.

15-3-1 Adding Variables

The procedure for adding variables depends on the point clicked in the Classification Panel.

Directory tree under *All Variables*	The variable will be added, but it will not be registered in the data collection pattern. To register the variable in a data collection pattern, it is necessary to select *Register to the Collection Pattern*.
Directory tree under *All Sampling Patterns*	The added variable will be registered in the selected data collection pattern.

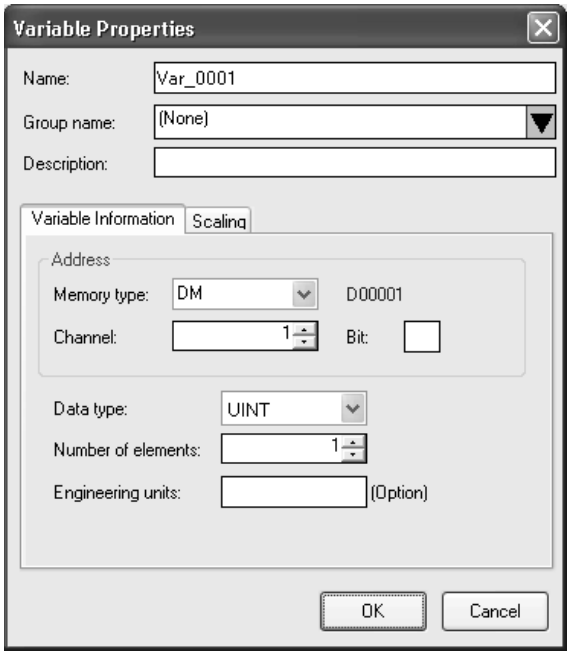
1,2,3...

1. Click the SPU Console's **Collection Setting** Tab.
2. Select ***Variable Setting - Add Variable*** or right-click the Variable Panel and select ***Add Variable*** from the popup menu.

   The Variable Properties Dialog Box will be displayed. For details, refer to *15-3-2 Operations in the Variable Properties Dialog Box*.

15-3-2 Operations in the Variable Properties Dialog Box

Use the Variable Properties Dialog Box to make variable settings such as the variable's address and data type. Enter the new settings in the dialog box and click the **OK** Button to change the variable's settings.



The following table describes the variable's settings.

Item	Function
Name	Sets the variable's name.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

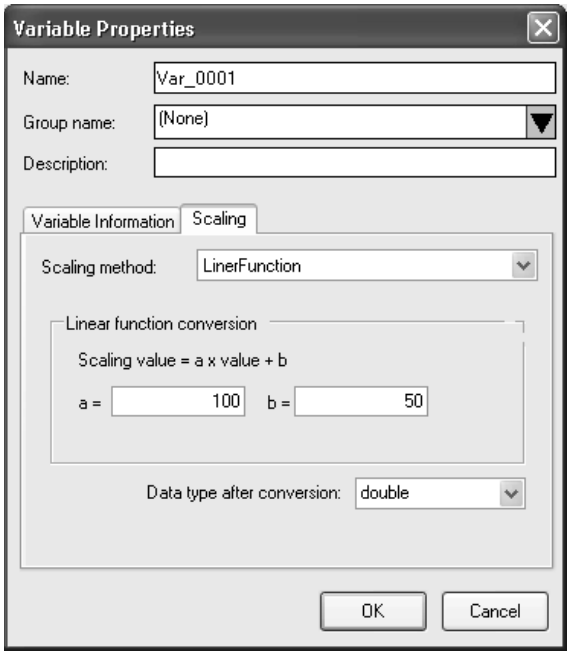
Item	Function
Address	Specifies the variable's memory location. Specify the data area in the *Memory type* Field and specify the offset from the beginning of the data area in the *Channel* Field. If the variable represents a bit, specify the bit number (0 to 15) in the *Bit* Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type.
Number of elements	Specifies the number of elements of data for a data array. A number of consecutive data elements with the same properties can be handled as a single variable. When the data type is set to *STRING*, the *Number of elements* sets the length of the string.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *15-3-3 Setting the Scaling Function for a Variable*.

15-3-3 Setting the Scaling Function for a Variable

If a variable requires scaling, the scaling method can be specified on the Variable Properties Dialog Box's Scaling Tab Page. If a variable does not require scaling, it isn't necessary to specify scaling function.



The following table describes the *Scaling methods* on the Scaling Tab Page.

Item	Function
Linear function conversion	The memory value is converted with a linear equation and the result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*. The result is calculated from the specified constants (a and b) as follows: Result = a × memory value + b
Maximum/Minimum conversion	Memory values with a predetermined upper and lower limit are converted according to that upper and lower limit range and the result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*.
Decimal position conversion	The memory value's decimal point can be moved from left to right to the specified position. The result is recorded as the *Data type after conversion*. Specify a floating-point data type (float or double) for the *Data type after conversion*.

15-3-4 Adding Multiple Variables Together

A number of consecutive variables with the same properties can be registered together.

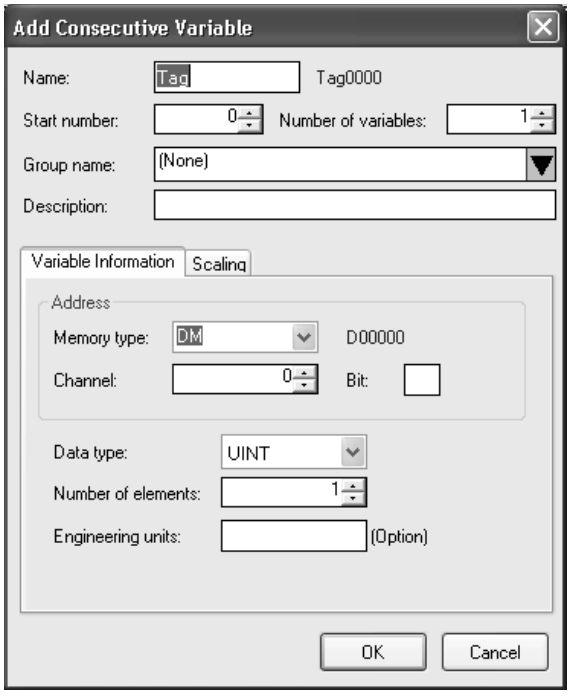
1,2,3... 1. Click the SPU Console's **Collection Setting** Tab.

2. Select ***Variable Setting - Add Consecutive Variables*** or right-click the Variable Panel and select ***Add Consecutive Variables***.

   The Add Consecutive Variables Dialog Box will be displayed. For details, refer to *15-3-5 Operations in the Add Consecutive Variables Dialog Box*.

15-3-5 Operations in the Add Consecutive Variables Dialog Box

Use the Add Consecutive Variables Dialog Box to set a number of consecutive variables with the same properties. make variable settings such as the variable's address and data type. Enter the settings in the dialog box and click the **OK** Button to register the consecutive variables.



The following table describes the array variable's settings.

Item	Function
Name	Sets the variable's name. An index number will be attached after the variable name.
Start number	Specifies the starting number of the index number that appears after the variable name.
Number of variables	Specifies the number of variables being added.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

Item	Function
Address	Specifies the variable's memory location. Specify the data area in the *Memory type* Field and specify the offset from the beginning of the data area in the *Channel* Field. If the variable represents a bit, specify the bit number (0 to 15) in the *Bit* Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type.
Number of elements	Specifies the number of elements of data for a data array. A number of consecutive data elements with the same properties can be handled as a single variable. When the data type is set to *STRING*, the *Number of elements* sets the length of the string.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *15-3-3 Setting the Scaling Function for a Variable*.

15-3-6 Using the CX-Programmer's Variables

Variables set with the CX-Programmer can be used.

1,2,3...

1. Start the CX-Programmer and display the variable table.
2. Select the variables to be used in the SPU-Console and select ***Edit - Copy***.
3. Click the SPU-Console's **Collection Setting** Tab and display the Variable Panel.
4. Select ***Variable Setting - Paste from the Clip Board***. If the variable does not have a variable name, a variable name will be allocated automatically based on the variable's address and comment information.

Note This function is supported by CX-Programmer version 2.0 and later versions. The following variables cannot be pasted.

- Variables with data type LINT, ULINT, ULINT_BCD, or NUMBER
- Variables with automatically allocated addresses

15-3-7 Changing Variables

1,2,3...

1. Click the SPU Console's **Collection Setting** Tab and display the Variable Panel.
2. Select the variable to be changed by clicking that variable's row header cell.
3. Select ***Variable Setting - Variable Properties*** or right-click the Variable Panel and select ***Variable Properties*** from the popup menu.
4. Enter the new settings in the Variable Properties Dialog Box and click the **OK** Button. For details on these operations, refer to *15-3-2 Operations in the Variable Properties Dialog Box*.

15-3-8 Deleting Variables

1,2,3...

1. Click the SPU Console's **Collection Setting** Tab and display the Variable Panel.
2. Select the variable to be changed by clicking that variable's row header cell in the list. To select more than one variable, select the first variable, press and hold the **Ctrl** or **Shift** Key, and click the row header cell of the other variables to be deleted.
3. Select ***Variable Setting - Delete Variable*** or right-click the Variable Panel and select ***Delete Variable*** from the popup menu.

15-3-9 Selecting a Data Collection Pattern and Adding Variables

When the data collection pattern has been decided in advance, the data collection pattern can be selected and a variable can be added to that pattern. The added variable will be automatically collected and recorded in the specified data collection pattern.

1,2,3...

1. Click the SPU Console's **Collection Setting** Tab and display the Classification Panel.
2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.

3. Select ***Variable Setting - Add Variable*** or right-click the Variable Panel and select ***Add Variable*** from the popup menu.

   The Variable Properties Dialog Box will be displayed. For details on the dialog box operations, refer to *15-3-2 Operations in the Variable Properties Dialog Box*.

15-3-10 Deleting Variables from a Data Collection Pattern

A registered variable can be deleted from a data collection pattern. The variable's settings are not deleted even though the variable is deleted from the data collection pattern. The deleted variable can still be found and reused in the Variable Panel's *All Variables* directory.

1,2,3...

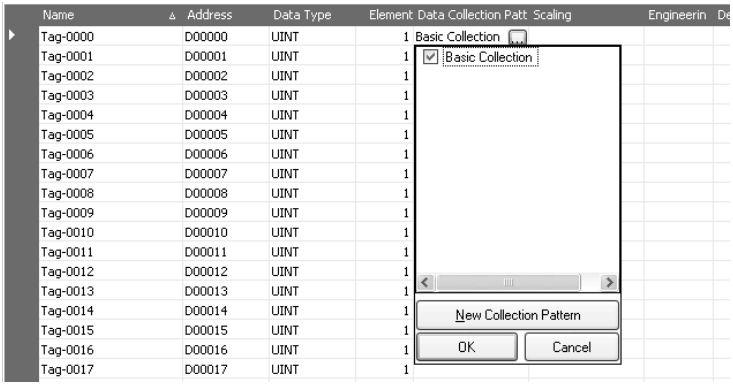
1. Click the SPU Console's **Collection Setting** Tab and display the Classification Panel.
2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.
3. Select the variable to be deleted by clicking that variable's row header cell.
4. Select ***Variable Setting - Delete Variable*** or right-click the Variable Panel and select ***Delete Variable*** from the popup menu.

15-3-11 Registering an Existing Variable in a Data Collection Pattern

A variable that was set previously can be specified and registered in a data collection pattern. A variable can also be registered in multiple data collection patterns, which allows the same variable to be collected and recorded by multiple methods.

1,2,3...

1. Click the SPU Console's **Collection Setting** Tab and display the Variable Panel corresponding to the Classification Panel's *All Variables* directory.
2. Click the desired variable's cell in the *Data Collection Pattern* column and click the **...** Button.
3. A popup window will be displayed. Select the data collection patterns in which the variable will be registered (by adding checks next to those patterns) and click the **OK** Button.



Note There are two other ways to register the variables:

- Register the variables by selecting ***Variable Setting - Register to the Collection Pattern***.
- Register the variables by dragging and dropping them.

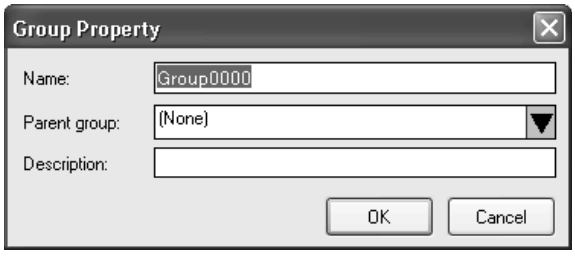
15-3-12 Managing Variables in Groups

Variables can be organized and managed in groups.

Creating a Group

To create a group, select the *Display in Groups* Option in the Classification Panel and select ***Variable Setting - Add Group***.

The Group Property Dialog Box will be displayed.



Add the group's name in the *Name* Field. A description of the group can be entered in the *Description* Field. (This entry can be omitted.)

Note The following characters cannot be used in the variable's *Name* or *Group name*: "/", "\", commas, or spaces.

Deleting a Group

To delete a group, select the group to be deleted in the Classification Panel and select ***Variable Setting - Delete Group***.

If a group is deleted, all of the settings under the group will be deleted.

Changing the Group Name

To change a group's name, select the group and select ***Variable Setting - Group Properties***.

Copying to a Group

To copy a variable to another group, select the variable to be copied in the Variable Panel, press and hold the **Ctrl** Key, and drag and drop the variable in the destination group in the Classification Panel.

Moving a Group

To move a variable to another group, select the variable to be moved in the Variable Panel and drag and drop the variable in the destination group in the Classification Panel.

15-3-13 Changing the Order of Variables in a Data Collection Pattern

Variable data is recorded in a file in the order in which the variables appear in the Variable Panel. The recording order can be changed by moving a variables to a different position in the list.

1,2,3...

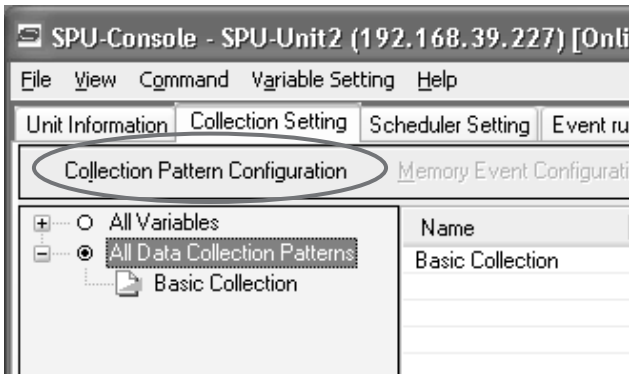
1. Click the SPU Console's **Collection Setting** Tab and display the Classification Panel.
2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.
3. Select the variable to be moved by clicking that variable's row header cell in the list.
4. Drag the selected variable and drop it in the destination location.

15-4 Setting Data Collection Patterns

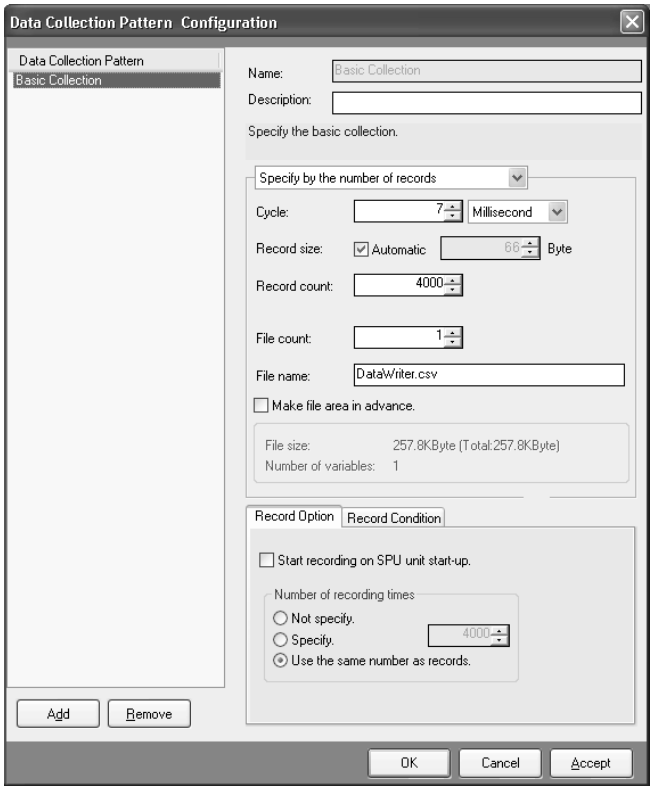
15-4-1 Adding a Data Collection Pattern

1,2,3... 1. To add a data collection pattern, click the SPU Console's **Collection Setting** Tab and select ***Collection Pattern Configuration***.

The Data Collection Pattern Configuration Dialog Box will be displayed.



2. Click the **Add** Button in the Data Collection Pattern Configuration Dialog Box.



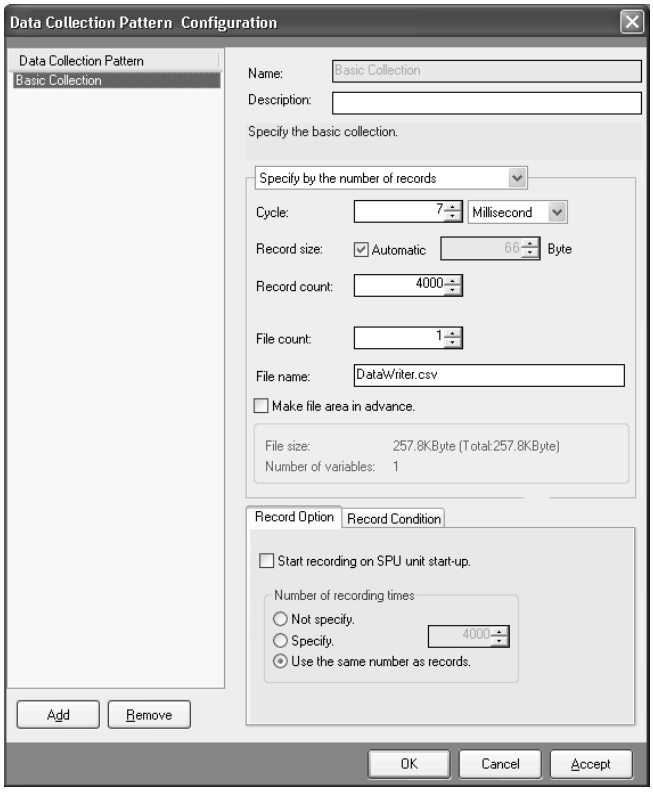
3. Input the data collection pattern settings such as the *Name* and *Description*.

The following table describes the settings.

Item	Function
Name	Enter the data collection pattern's name.
Description	Enter a description of the data collection pattern.
Cycle	Specify the data collection cycle.
Record size	In most cases, select the *Automatic* Option. When *Automatic* is selected, the record size is calculated automatically. When specifying the record size, specify the size of each record that will be stored in the file in bytes.
Record count	Specify the number of records that will be stored in a single file. (Specify the *Record count* when *Specify by the number of records* is selected.)
Period	Specify a period of time in which records will be stored in a single file. (Specify the *Period* when *Specify by the collection period* is selected.)
File count	Specify the number of files to be stored. When multiple files are specified, the files are stored in a folder with the same name as the specified *File name*. The file names will be the specified *File name* with an attached index number.
File name	Specify the name of the file in which the results will be stored.
Make file area in advance.	When this option is selected, files of the specified size are created when the new settings are accepted. Since the files are created before starting to collect data, there will not be an insufficient memory error during collection. **Note** When this option is selected, it will take some time to create the files after the settings are OKed or Accepted.

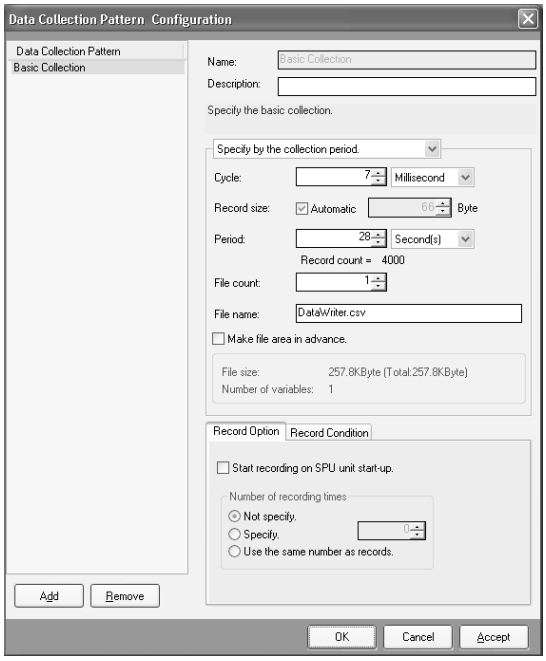
Specifying the Number of Records

When *Specify by the number of records* is selected, the number of records recorded in a single file is fixed at the specified number.



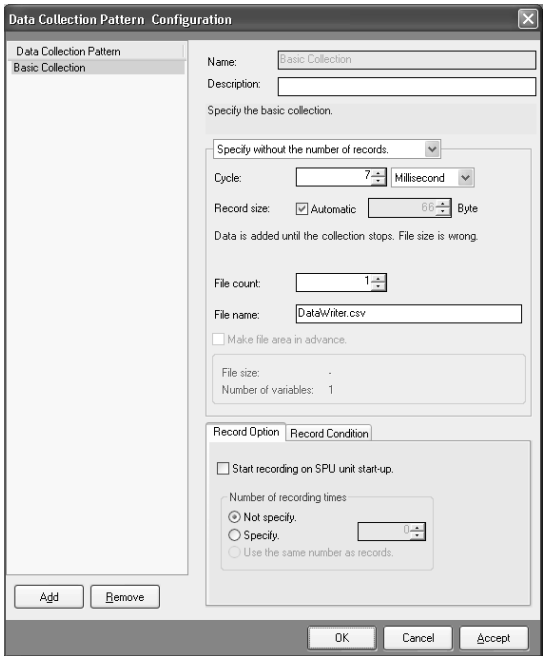
Specifying the Collection Period

When *Specify by the collection period* is selected, the number of records recorded in a single file is determined by the period and cycle settings. The number of records recorded in a single file is fixed.



Unspecified Number of Records

When *Specify without the number of records* is selected, data will be added to the file until data collection is stopped. With this method, all of the records from the start to the end of sampling can be recorded in a single file.

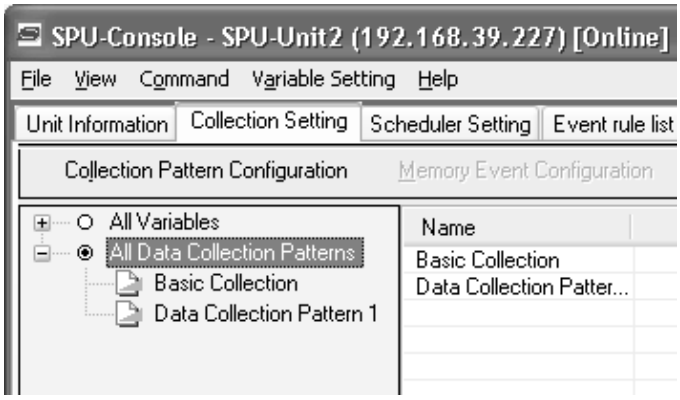


Note (a) When saving data without a specified number of records, the file size will continuously increase until data collection is stopped. Be sure that there is enough memory available in the Memory Card.

(b) When saving data in a single file and leaving the number of records unspecified, existing data in the file will be cleared when

collection starts. We recommend saving data in multiple files when leaving the number of records unspecified.

4. After inputting the settings, click the **OK** or **Accept** Button.
5. Confirm that the data collection pattern has been added to the Classification Panel's *All Data Collection Patterns* directory tree.

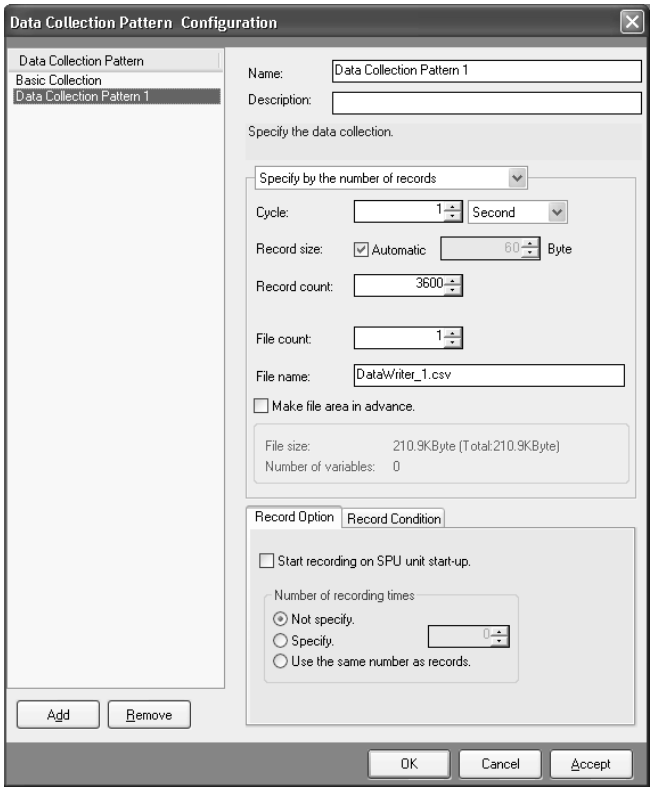


15-4-2 Deleting a Data Collection Pattern

Use the following procedure to delete a data collection pattern.

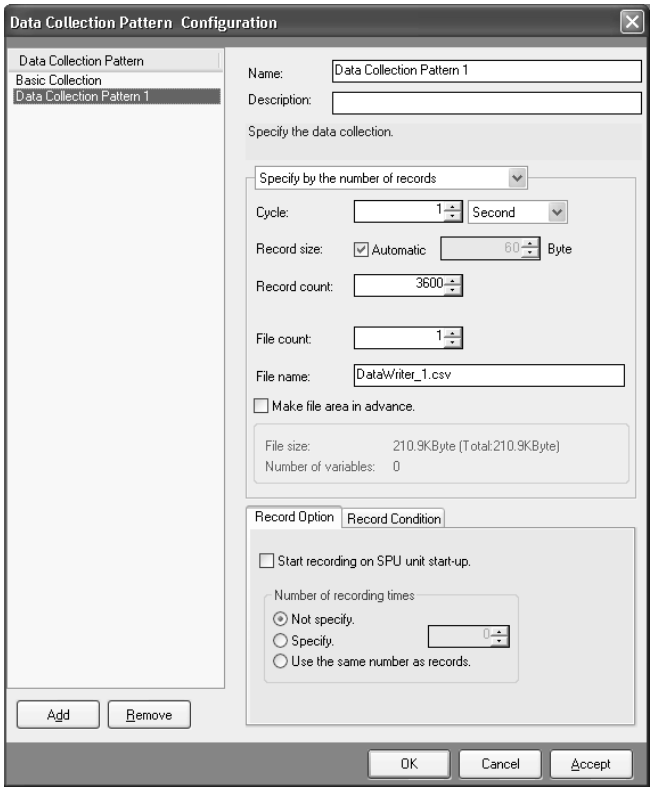
1,2,3... 1. Click the SPU Console's **Collection Setting** Tab and select ***Collection Pattern Configuration***.

2. Select the data collection pattern to be deleted in the pane on the left side of the Data Collection Pattern Configuration Dialog Box and click the **Remove** Button.



15-4-3 Specifying Record Options

The Data Collection Pattern Configuration Dialog Box's Record Option Tab Page contains settings that can specify the number of collections (recording times) as well as whether or not collection will start automatically when the SYSMAC SPU Unit starts operating.



Starting Data Collection on SYSMAC SPU Unit Start-up

When *Start recording on SYSMAC SPU Unit start-up* is selected, The data collection pattern will be started automatically when the SYSMAC SPU Unit starts operating.

Specifying the Number of Collections

Collection can be stopped automatically when the specified number of collections have been performed.

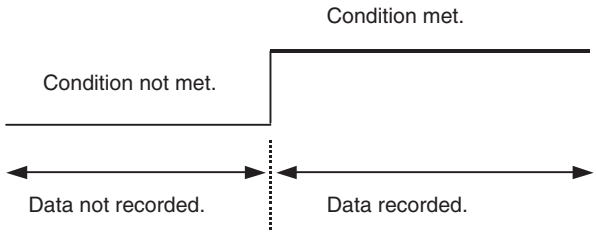
When *Not specify* is selected, collection will continue.

When *Specify* is selected, collection will stop automatically when the specified number of collections have been recorded.

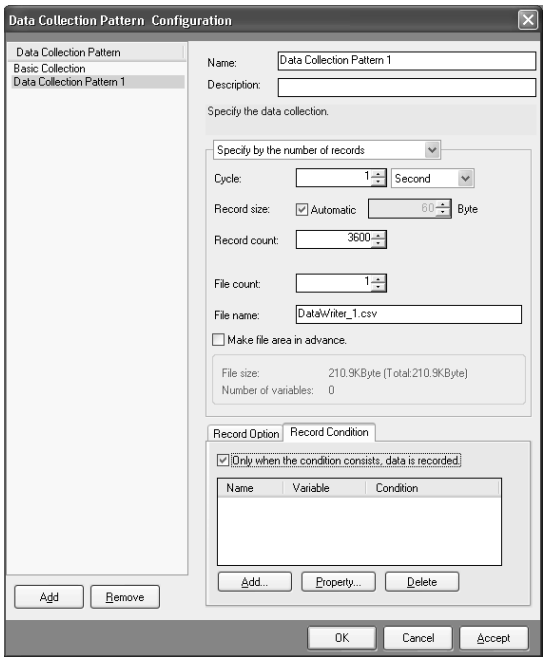
When *Use the same number as records* is selected, collection will stop automatically when the number of collections equals the number of records specified with the *Record count* setting.

15-4-4 Setting Record Conditions

A record condition can be set so that data will be recorded only when the condition is met.



Conditions are set on the Record Condition Tab Page in the Data Collection Pattern Configuration Dialog Box.



Note If the *Only when the condition consists, data is recorded* Option is not selected, data will be recorded continuously during the collection period.

Adding Conditions

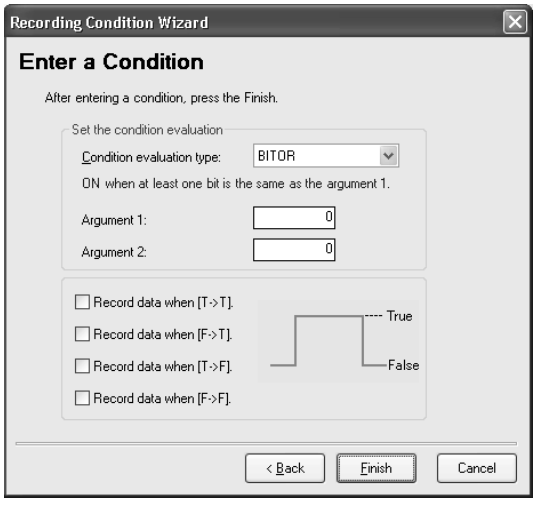
1,2,3... 1. Select ***Only when the condition consists, data is recorded*** and then click the **Add** Button.

The Recording Condition Wizard shown in step 2 will be displayed.

2. Input the condition name and select the variable to use to set the condition. Input an alphanumeric text string for the condition name.

Note The variable used to set a condition must be registered in advance in the data collection pattern.

3. Click the **Next** Button.



4. Input the condition and then click the **Finish** Button.

For *Set the condition evaluation*, set the condition evaluation type and arguments for comparison with memory contents. The following table shows the condition evaluation types and arguments.

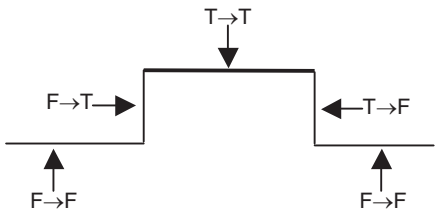
Condition evaluation type	Argument 1	Argument 2	Meaning
BITOR	Required	---	One of the same bits is ON as in argument 1.
BITAND	Required	---	All of the same bits are ON as in argument 1.
TRUE	---	---	Always true
NoneZero	---	---	Value ≠ 0
EQ	Required	---	Value = Argument 1
LT	Required	---	Value < Argument 1
LE	Required	---	Value ≤ Argument 1
GT	Required	---	Value > Argument 1
GE	Required	---	Value ≥ Argument 1
GELE	Required	Required	Argument 1 ≤ Value ≤ Argument 2
GTLT	Required	Required	Argument 1 < Value < Argument 2
GELT	Required	Required	Argument 1 ≤ Value < Argument 2
GTLE	Required	Required	Argument 1 < Value ≤ Argument 2
PrevBITOR	---	---	One of the same bits is ON as in previous value.
PrevBITAND	---	---	All of the same bits are ON as in previous value.
PrevEQ	---	---	Value = Previous value
PrevLT	---	---	Value < Previous value
PrevLE	---	---	Value ≤ Previous value
PrevGT	---	---	Value > Previous value
PrevGE	---	---	Value ≥ Previous value

---: Not required.

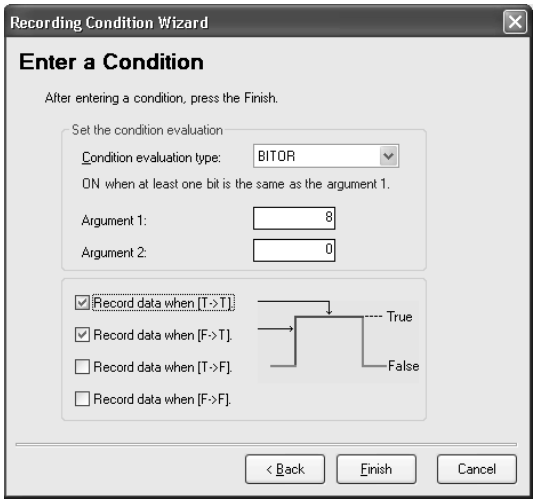
The pattern for which sampling data is to be recorded for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
True → True	Data is recorded when the evaluation remains true.
True → False	Data is recorded when the evaluation changes from true to false.
False → True	Data is recorded when the evaluation changes from false to true.
False → False	Data is recorded when the evaluation remains false.

The following diagram illustrates these settings.



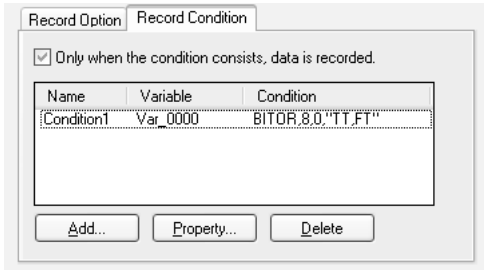
For example, the following settings are used to record data only when bit 4 is ON.



Note Evaluations are calculated based on the word contents of the address specified for the variable, not on the converted value for the data type of the variable.

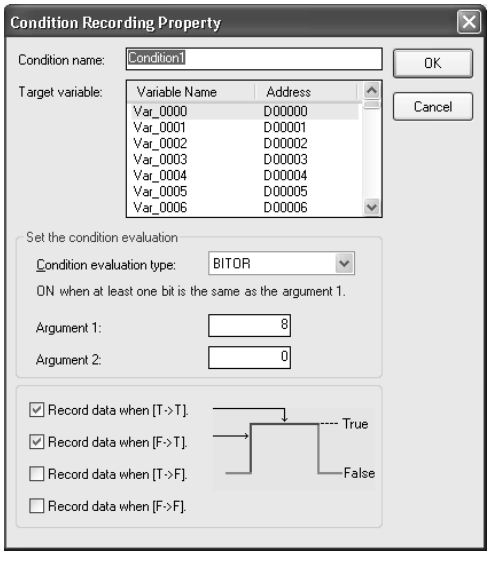
Deleting a Condition

To delete a condition, select the condition and click the **Delete** Button.



Changing a Condition

To change a condition, select the condition and click the **Property** Button.



15-5 Setting Memory Events

The procedures used to set rules for memory events that occur when values in memory satisfy specific conditions are described here.

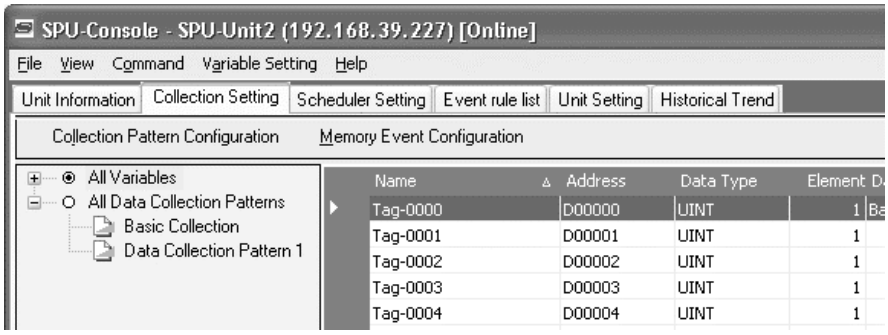
To set memory events, variables are set in advance for the memory elements that will be used as the conditions. Memory event rules are set for variables. Set the data collection patterns used for processing when the memory event conditions are met in advance.

15-5-1 Adding Memory Event Rules

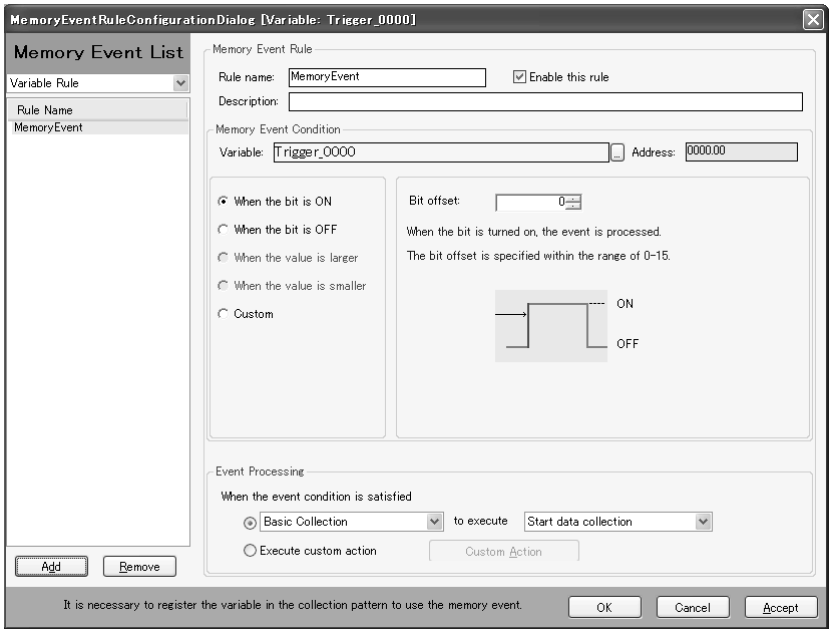
Use the following procedure to add memory event rules.

1,2,3...

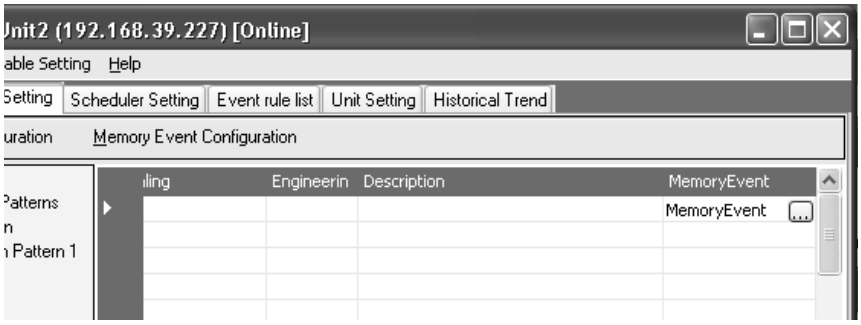
1. Select the **Collection Setting** Tab to display the list of variables under *All Variables* in the Classification Panel.
2. Select the line header of the variable for which the memory event is to be set from the list of variables. Select ***Memory Event Configuration*** to display the Memory Event Rule Configuration Dialog Box.



3. Click the **Add** Button in the Memory Event Rule Configuration Dialog Box.



4. Enter the memory event rule name, event conditions, and event processing. For details on settings refer to *15-5-2 Setting Memory Event Rules*.
5. After entering the settings, click the **OK** Button or the **Accept** Button.
6. Check that the memory event has been added to the Memory Event column in the Memory Event List.



Note When using memory events, always register the variables set for the memory events in the data collection pattern. Otherwise, event processing will not be executed. If other variables set for the same address are registered in the data collection pattern, however, event processing will be executed for them.

15-5-2 Setting Memory Event Rules

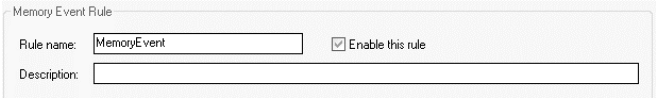
Memory event rules are set for the variables selected in the list of variables.

Note The memory event conditions are determined by the contents of the addresses, and not by the values specified by the variable data type.

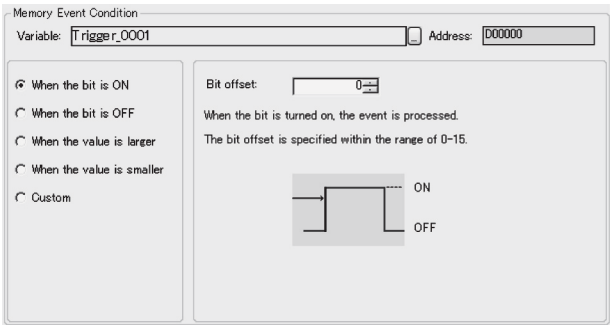
The settings are as follows:

Item		Description
Rule name		Enter the rule name.
Description		Enter the rule description (can be omitted)
Enable this rule		Deselect to disable the memory event rule.
Memory Event Condition	When the bit is ON	The event is processed when the bit specified in the *Bit offset* Field turns ON.
	When the bit is OFF	The event is processed when the bit specified in the *Bit offset* Field turns OFF.
	When the value is larger	The event is processed when the value is larger than the value specified in the *Argument value* Field.
	When the value is smaller	The event is processed when the value is smaller than the value specified in the *Argument value* Field.
	Custom	Enter user-specified condition settings when required.
Event Processing		Specify the processing to be performed when the memory event condition is satisfied.

1,2,3... 1. Enter the rule name and description.

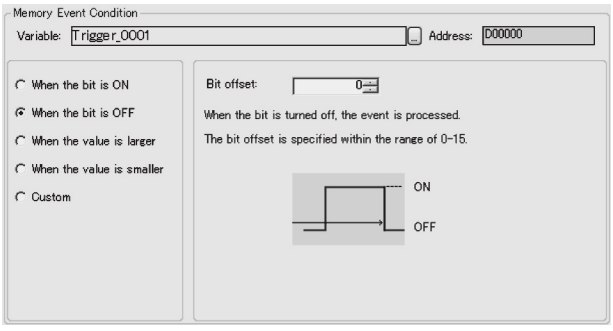


2. Specify the memory event condition.
   - Example: When the bit is ON



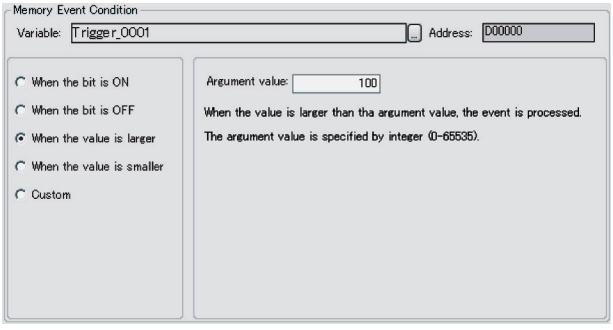
   Specify the bit offset of the address specified for the *Variable* Field between 0 and 15.

   - Example: When the bit is OFF



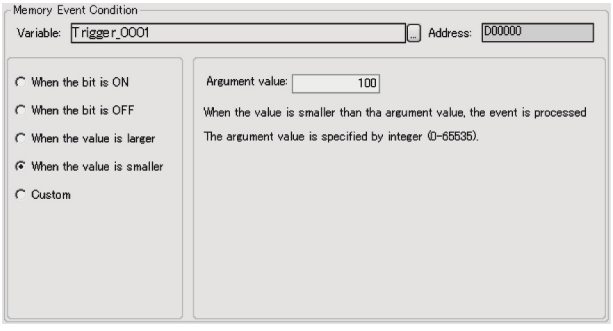
   Specify the bit offset between 0 and 15.

   - Example: When the value is larger



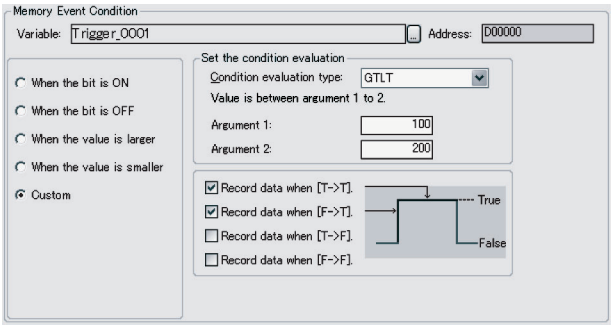
   Specify the argument value between 0 and 65535.

   - Example: When the value is smaller



   Specify the argument value between 0 and 65535.

- Example: Custom



Enter the condition evaluation type and arguments. The following table lists the condition evaluation types and arguments.

Condition evaluation type	Argument 1	Argument 2	Meaning
BITOR	Required	---	One of the same bits is ON as in argument 1.
BITAND	Required	---	All of the same bits are ON as in argument 1.
TRUE	---	---	Always true
NoneZero	---	---	Value ≠ 0
EQ	Required	---	Value = Argument 1
LT	Required	---	Value < Argument 1
LE	Required	---	Value ≤ Argument 1
GT	Required	---	Value > Argument 1
GE	Required	---	Value ≥ Argument 1
GELE	Required	Required	Argument 1 ≤ Value ≤ Argument 2
GTLT	Required	Required	Argument 1 < Value < Argument 2
GELT	Required	Required	Argument 1 ≤ Value < Argument 2
GTLE	Required	Required	Argument 1 < Value ≤ Argument 2
PrevBITOR	---	---	One of the same bits is ON as in previous value.
PrevBITAND	---	---	All of the same bits are ON as in previous value.
PrevEQ	---	---	Value = Previous value
PrevLT	---	---	Value < Previous value
PrevLE	---	---	Value ≤ Previous value
PrevGT	---	---	Value > Previous value
PrevGE	---	---	Value ≥ Previous value

---: Not required.

The pattern for which event processing is to be executed for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
True → True	Event processing is executed when the evaluation remains true.
True → False	Event processing is executed when the evaluation changes from true to false.
False → True	Event processing is executed when the evaluation changes from false to true.
False → False	Event processing is executed when the evaluation remains false.

3. Specify the event processing to be executed.
Specify the collection pattern and processing to execute at the event destination when the event condition is satisfied.

The following table shows the event destination and processing that can be performed.

Destination	Processing	
Basic collection	Select from the following processing operations.	
	Start data collection	Starts basic collection. Same as the Start Basic Collection command.
	Stop data collection	Stops basic collection. Same as the Stop Basic Collection command.
	Switch file	Switches to the next file when data is being saved in multiple files.
	Terminate service	Not normally used.
Data collection (1 to 64)	Select from the following processing operations.	
	Start cyclic collection	Starts cyclic collection.
	Stop cyclic collection	Stops cyclic collection.
	Acquisition of data (one shot)	Records data once only when the condition is satisfied.
	Switch file	Switches to the next file when data is being saved in multiple files.
	Terminate service	Not normally used.
Scheduler	Not normally used.	
Archiver	Not normally used.	

Note When *Custom* is selected, the event destination, event ID, and other settings can be specified by the user. This option is for expansion purposes and is not normally used.

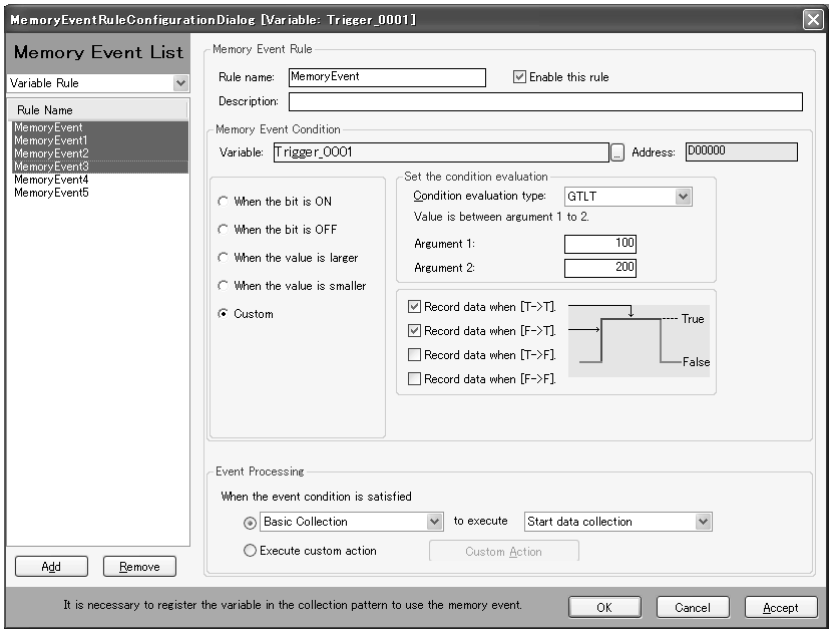
15-5-3 Deleting Memory Event Rules

Use the following procedure to delete memory event rules.

1,2,3...

1. Select the **Collection Setting** Tab to display the list of variables under *All Variables* in the Classification Panel.
2. Select the line header of the variable for which the memory event is to be deleted from the list of variables. Select ***Memory Event Configuration*** to display the Memory Event Rule Configuration Dialog Box.
3. Select the memory event rule to be deleted from the Memory Event List and click the **Remove** Button.

Note The Memory Event List displays the rules for the selected variable only. To delete rules for other variables, select ***All of the rules*** from the Memory Event List to display all the registered rules.

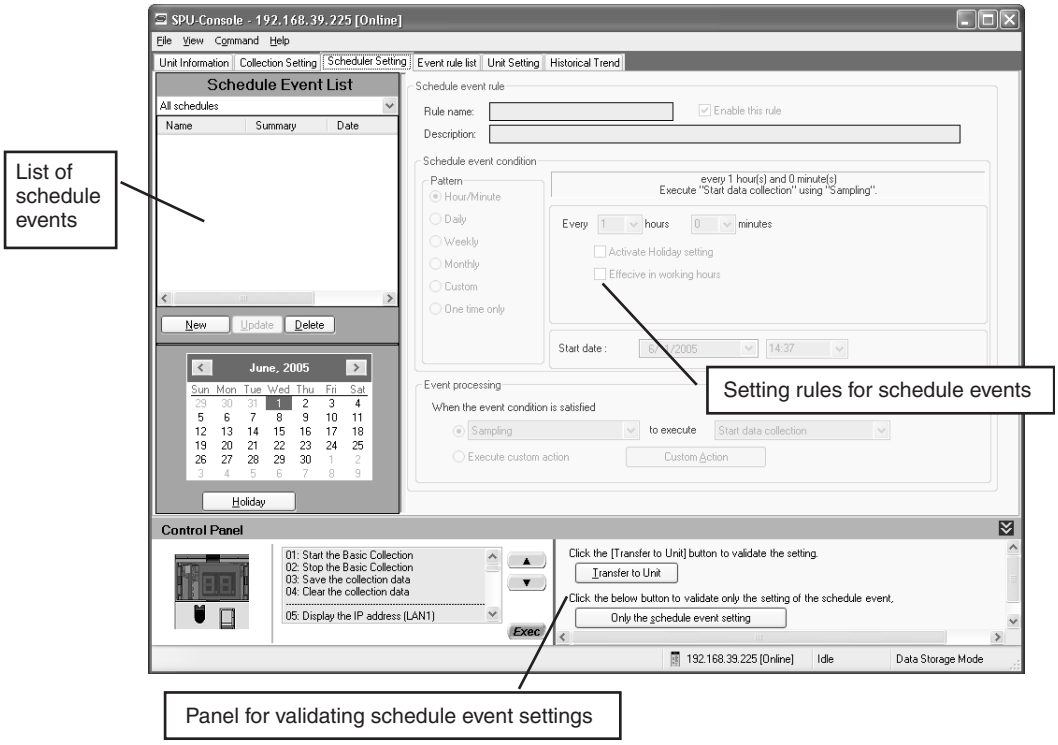


15-6 Setting Schedule Events

The procedure for setting rules for schedule events that occur at specific times or time intervals is described here.

15-6-1 Scheduler Setting Window Configuration

Click the **Scheduler Setting** Tab in SPU-Console to display the schedule setting window.

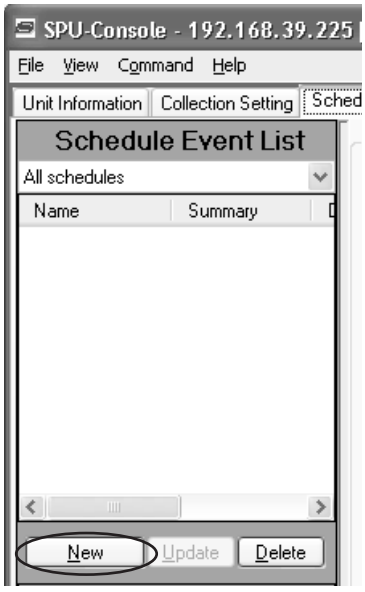


15-6-2 Adding Schedule Event Rules

Use the following procedure to add schedule event rules.

1,2,3... 1. Click the **Scheduler Setting** Tab.

2. Click the **New** Button in the Schedule Event List Pane.



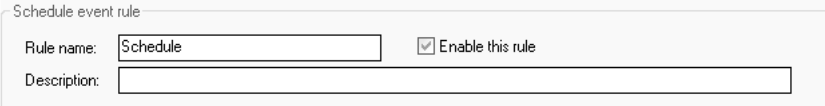
3. Set the name of the schedule event rule, the schedule event conditions, etc. For details on settings, refer to *15-6-3 Setting Schedule Event Rules*.
4. Click the **Update** Button to register the settings.

15-6-3 Setting Schedule Event Rules

The setting items for schedule events are as follows:

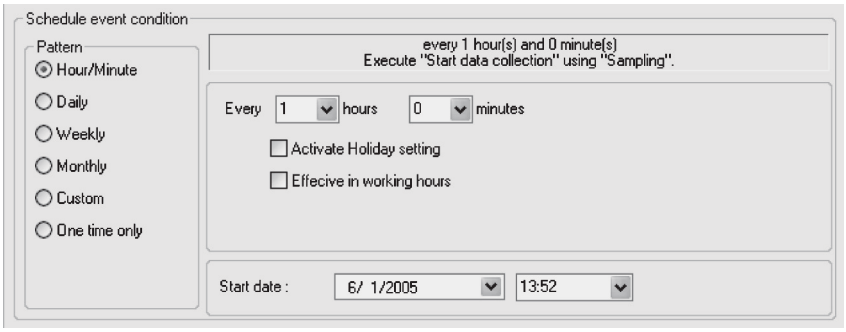
Item		Details
Rule name		Used to enter the rule name
Description		Used to enter a description of the rule (can be omitted).
Enable this rule		When deselected, the schedule event rule is disabled.
Schedule event condition	Hour/Minute	Specifies in hours/minutes.
	Daily	Specifies in days.
	Weekly	Specifies in weeks.
	Monthly	Specifies in months.
	Custom	Sets user-specified schedule event conditions.
	One time only	Specifies the date and time for a once-only event.
Event processing		Specifies the processing to be performed when the schedule event conditions are satisfied.

1,2,3... 1. Enter the rule name and description.



2. Specify the schedule event conditions.

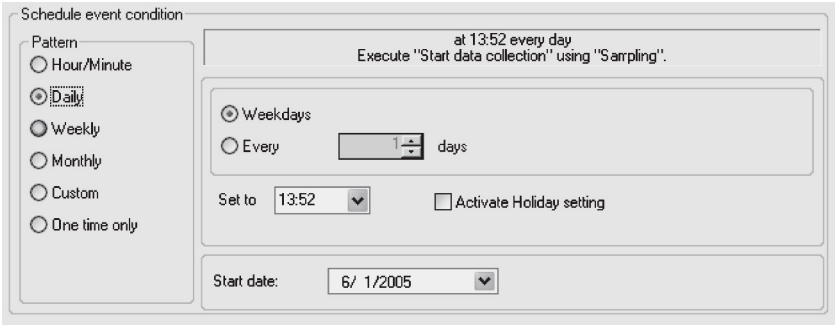
Hour/Minute Pattern



Use this setting to specify the schedule event in hour/minute intervals.

Item	Details
Hour/Minute	Specifies the schedule event interval.
Activate Holiday setting	When selected, the event will not be executed on holidays specified in the holiday settings.
Effective in working hours	When selected, the event will be executed from the start time until the finish time specified in the holiday settings.
Start date	Specifies the start date and time for executing the first schedule event.

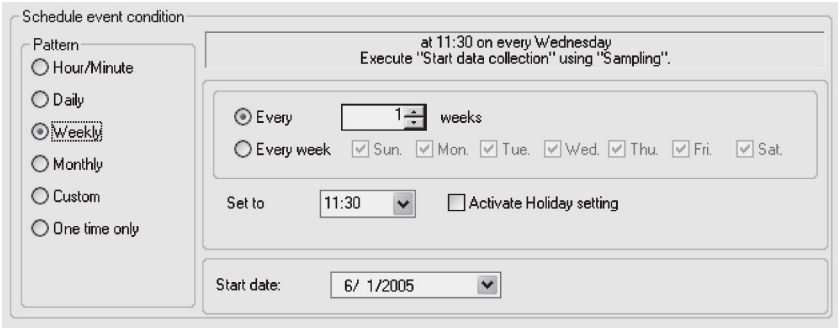
Daily Pattern



Use this setting to specify the schedule event in daily intervals.

Item	Details
Weekdays	Executes every weekday except for holidays specified in the holiday setting.
Every [number] days	Specifies the schedule event interval in days.
Set to	Specifies the time for executing the schedule event.
Activate Holiday setting	When selected, the schedule event is executed except on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

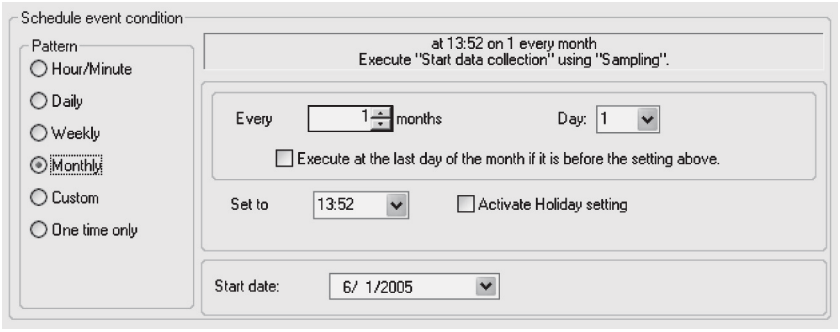
Weekly Pattern



Use this setting to specify the schedule event in weekly intervals.

Item	Details
Every [number] weeks	Specifies the schedule event interval in weeks.
Every week	Specifies the day of the week to execute the schedule event.
Set to	Specifies the time for executing the schedule event.
Activate Holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

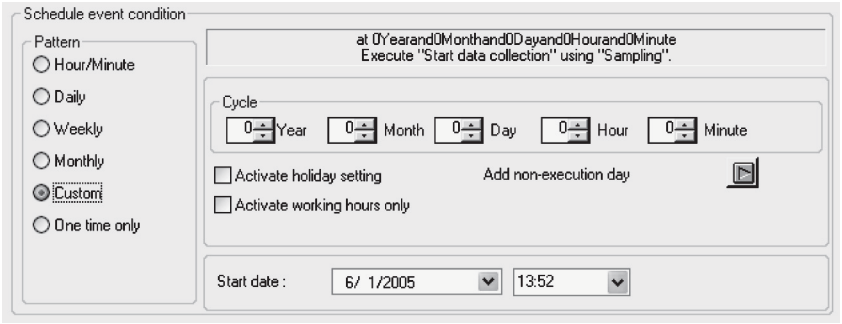
Monthly Pattern



Use this setting to specify the schedule event in monthly intervals.

Item	Details
Every [number] months	Specifies the schedule event interval in months and the day.
Execute at the last day of the month if it is before the setting above	When selected, if the specified day does not exist in that month, the schedule event will be executed on the last day of the month. Example: If “31” is specified for the day, the event will be executed on February 28, 2005.
Set to	Specifies the time for executing the schedule event.
Activate Holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

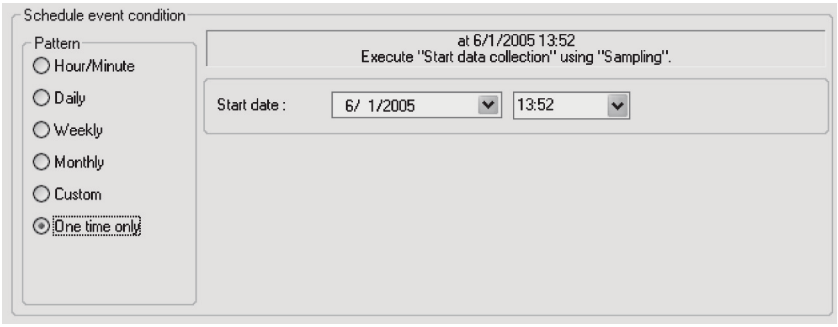
Custom Pattern



Use this setting to set user-specified schedule event conditions.

Item	Details
Cycle	Specifies the schedule event interval in years/months or in days/hours/minutes. The cycle must be completely within the same month or the same day, i.e., boundaries between two different months or two different days cannot be crossed.
Activate holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Activate working hours only	When selected, the event will be executed from the start time until the finish time specified in the holiday settings.
Add non-execution day	Additional non-execution days can be specified by clicking the adjacent arrow button. The non-execution setting will apply to this rule only.
Start date	Specifies the start date for executing the first schedule event.

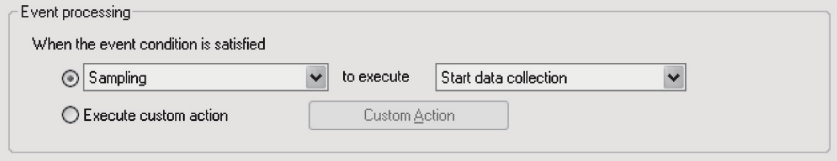
One Time Only Pattern



Use this setting to set a schedule event to occur once only

Item	Details
Start date	Specifies the start date and time for executing the schedule event.

3. Specify the event processing.
   Specify the collection pattern at the event destination and processing to be executed when the event conditions are satisfied.



The event destinations and processing are described in the following table.

Destination	Processing	
Basic collection	Select from the following processing operations.	
	Start data collection	Starts basic collection. Same as the Start Basic Collection command.
	Stop data collection	Stops basic collection. Same as the Stop Basic Collection command.
	Switch file	Switches to the next file when data is being saved in multiple files.
	Terminate service	Not normally used.

Destination	Processing	
Data collection (1 to 64)	Select from the following processing operations.	
	Start cyclic collection	Starts cyclic collection.
	Stop cyclic collection	Stops cyclic collection.
	Acquisition of data (one shot)	Records data once only when the condition is satisfied.
	Switch file	Switches to the next file when data is being saved in multiple files.
	Terminate service	Not normally used.
Scheduler	Not normally used.	
Archiver	Not normally used.	

Note When *Custom* is selected, the event destination, event ID, and other settings can be specified by the user. This option is for expansion purposes and is not normally used.

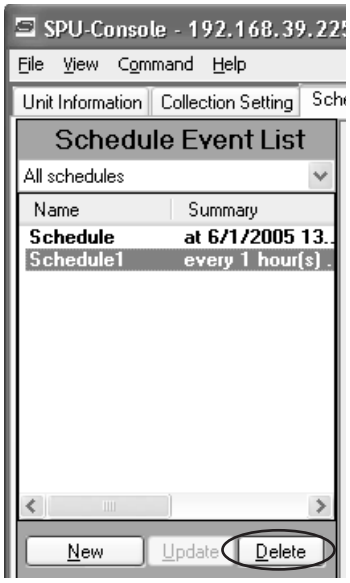
4. Click the **Update** Button to register the settings.

15-6-4 Deleting Schedule Event Rules

Use the following procedure to delete schedule event rules.

1,2,3...

1. Click the **Scheduler Setting** Tab.
2. Select the schedule event rule to be deleted from the *Schedule Event List* and click the **Delete** Button.



15-6-5 Changing Schedule Event Rules

Use the following procedure to change schedule events.

1,2,3...

1. Click the **Scheduler Setting** Tab.
2. Select the schedule event rule to be changed from the *Schedule Event List*.
3. Change the schedule event rule. For details on settings, refer to *15-6-3 Setting Schedule Event Rules*.
4. Click the **Update** Button to register the settings.

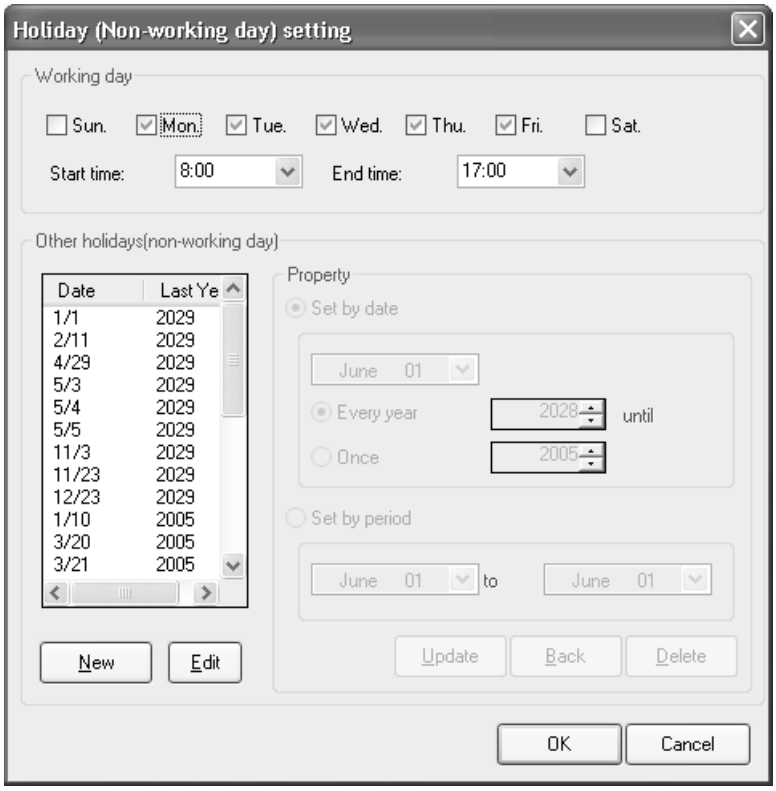
Note The condition pattern for a schedule event that has already been set cannot be changed to another pattern (e.g., changing from *Hour/Minute* pattern to *Daily* pattern).

15-6-6 Setting Holidays

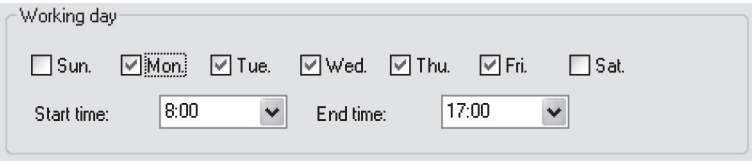
Set the holidays to be used and the operating times for the *Activate Holiday setting, Effective in working hours*, and *Activate working hours only* settings using the following procedure.

1. Click the **Scheduler Setting** Tab.
2. Click the **Holiday** Button.

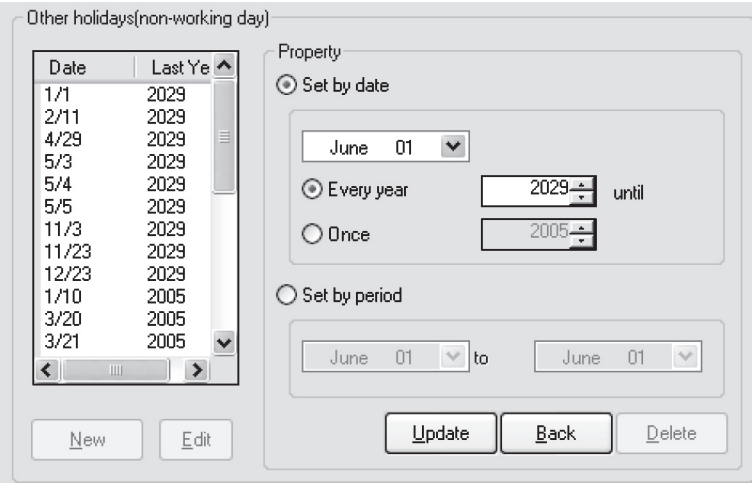
The Holiday (Non-working Day) Setting Dialog Box will be displayed.



3. Specify the working days, and work start and end times.



4. Specify holidays (non-working days).



To add holidays, click the **New** Button, and specify the holiday date or period under *Property*.

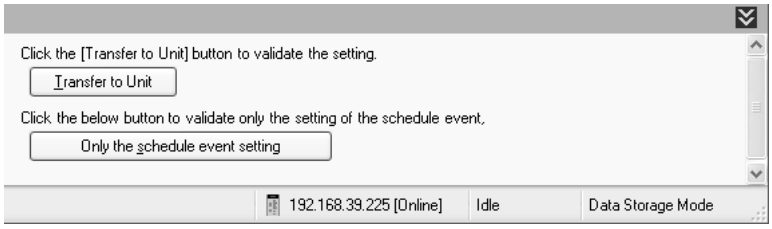
- When setting the date, set the date of the holiday. If the year is set, the holiday is only valid for that year.

- When setting the period, set the start and end dates of the holiday period. This setting is valid every year.

5. Click the **Update** Button.

15-6-7 Enabling the Scheduler Settings

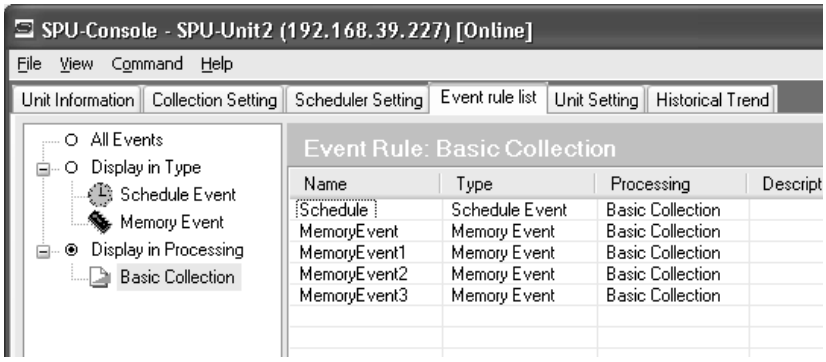
To enable the schedule event settings, select the Scheduler Setting Tab Page or Collection Setting Tab Page and click the **Transfer to Unit** Button. FOr details on the procedure, refer to *15-8 Enabling the Data Collection Settings*. To validate the schedule event settings, click the **Only the schedule event setting** Button.



15-7 Displaying the List of Events

A list of all the currently set events can be displayed on SPU-Console.

1,2,3... 1. Select the **Event Rule List** Tab in SPU-Console.



2. Click the sections in the left directory tree to display the following lists.

Item	List display
All Events	Displays all events.
Display in Type	Displays events by type. Schedule events: Displays schedule events. Memory events: Displays memory events.
Display in Processing	Displays event processing for each event.

15-8 Enabling the Data Collection Settings

Use the following procedure to enable the data collection settings. Always perform this procedure after the data collection settings have been changed.

Note (1) Confirm that the SYSMAC SPU Unit is connected before enabling the settings.

(2) When the changed settings are transferred, the existing SYSMAC SPU Unit settings will be overwritten.

(3) Never turn OFF the Unit's power supply while the Unit's settings are being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.

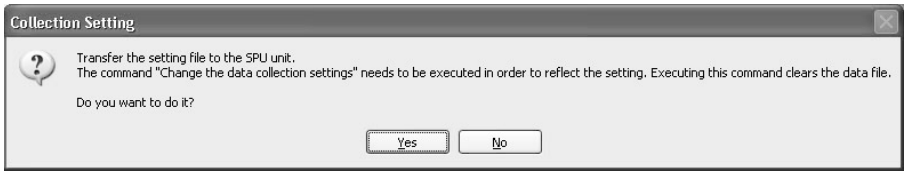
(4) If too many variables are registered in the data collection pattern, the settings may not be transferred correctly. In this situation, reduce the number of variables and re-transfer the settings.

1,2,3... 1. Confirm that variable settings and data collection pattern settings have been completed.

2. Click the SPU Console's **Collection Setting** Tab.

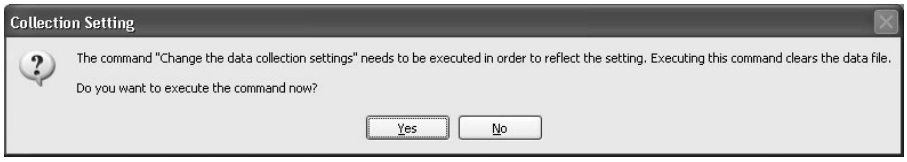
3. Click the **Transfer to Unit** Button in the SPU-Console's *Control Panel*.

   The following dialog box will be displayed to confirm the transfer.



4. Click the **Yes** Button to proceed with the transfer.

   A dialog box will be displayed to indicate that the data is being transferred and then the following dialog box will be displayed to confirm that the SYSMAC SPU Unit's data collection settings will be changed.



5. Click the **Yes** Button to change the data collection settings.

   The SYSMAC SPU Unit's 7-segment display will read "P1" through "PE" while the data collection settings are being changed. The display will return to "-D" when the change is completed. The new settings will be effective when the "-D" display appears.

15-9 Executing Data Collection

15-9-1 Starting Basic Collection

Basic collection can be performed by executing command 01 (Start the Basic Collection). For details on command execution methods, refer to *SECTION 6 Executing Commands*.

Note (1) Data collection patterns 1 to 64 cannot be operated from commands. Operate these patterns either from memory events or schedule events.

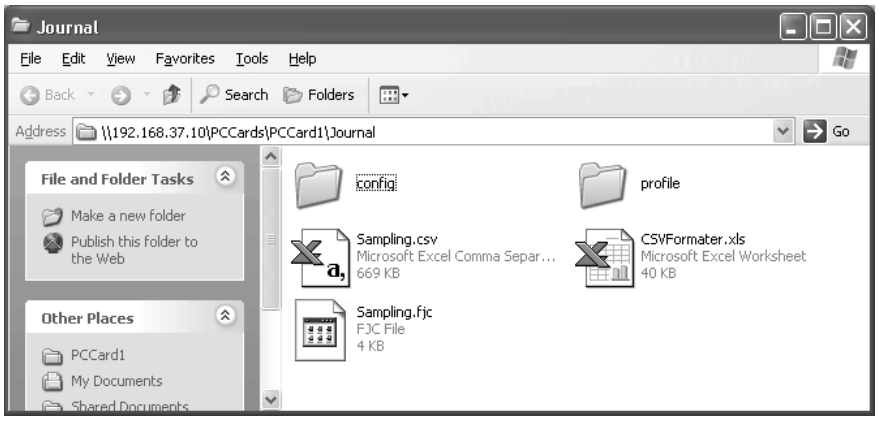
(2) Idle status will remain even if collection for data collection patterns 1 to 64 is started.

15-10 Displaying the Collection Result Folder

The collection files can be accessed from the computer by using a shared folder on a Windows network. Here, an example using Microsoft Excel is described. In this example, it is assumed that Excel is already installed and that CSV files are associated with it.

1,2,3... 1. Select ***View - Display the Unit Folder*** from the SPU-Console menus.

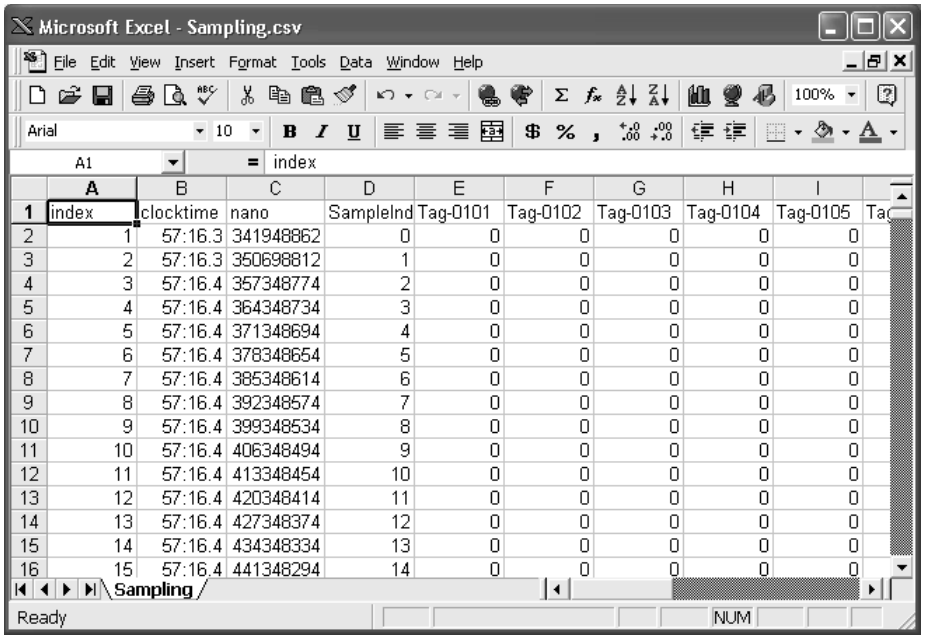
Explorer will be started and the folder containing the collection results will be displayed.



2. Double-click the collection file to display.

Excel will be started and the contents of the collection file will be displayed.

If the CSV file extension is associated with an application other than Excel, the associated application will be started.



	A	B	C	D	E	F	G	H	I
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105
2	1	57:16.3	341948862	0	0	0	0	0	0
3	2	57:16.3	350698812	1	0	0	0	0	0
4	3	57:16.4	357348774	2	0	0	0	0	0
5	4	57:16.4	364348734	3	0	0	0	0	0
6	5	57:16.4	371348694	4	0	0	0	0	0
7	6	57:16.4	378348654	5	0	0	0	0	0
8	7	57:16.4	385348614	6	0	0	0	0	0
9	8	57:16.4	392348574	7	0	0	0	0	0
10	9	57:16.4	399348534	8	0	0	0	0	0
11	10	57:16.4	406348494	9	0	0	0	0	0
12	11	57:16.4	413348454	10	0	0	0	0	0
13	12	57:16.4	420348414	11	0	0	0	0	0
14	13	57:16.4	427348374	12	0	0	0	0	0
15	14	57:16.4	434348334	13	0	0	0	0	0
16	15	57:16.4	441348294	14	0	0	0	0	0

Note When displaying collection files with Excel, the Excel macro CSVFormatter.xls is used, e.g., to display time stamps in a more readable form.

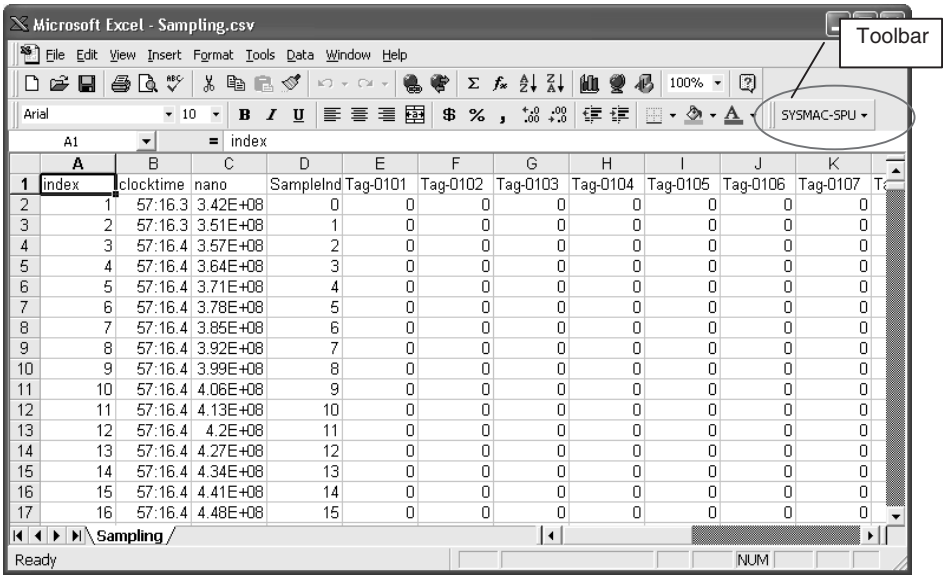
This macro can be used for the following.

(1) Organize the Excel display of the collection file contents, e.g., make the time field easier to read.

(2) Calculate the difference in time between records and display it in an Excel column (column heading: diff[ms]). This can be used to evaluate the difference in the collection cycle that was set and the actual collection behavior of the SYSMAC SPU Unit.

The CSVFormatter.xls macro is used as follows:

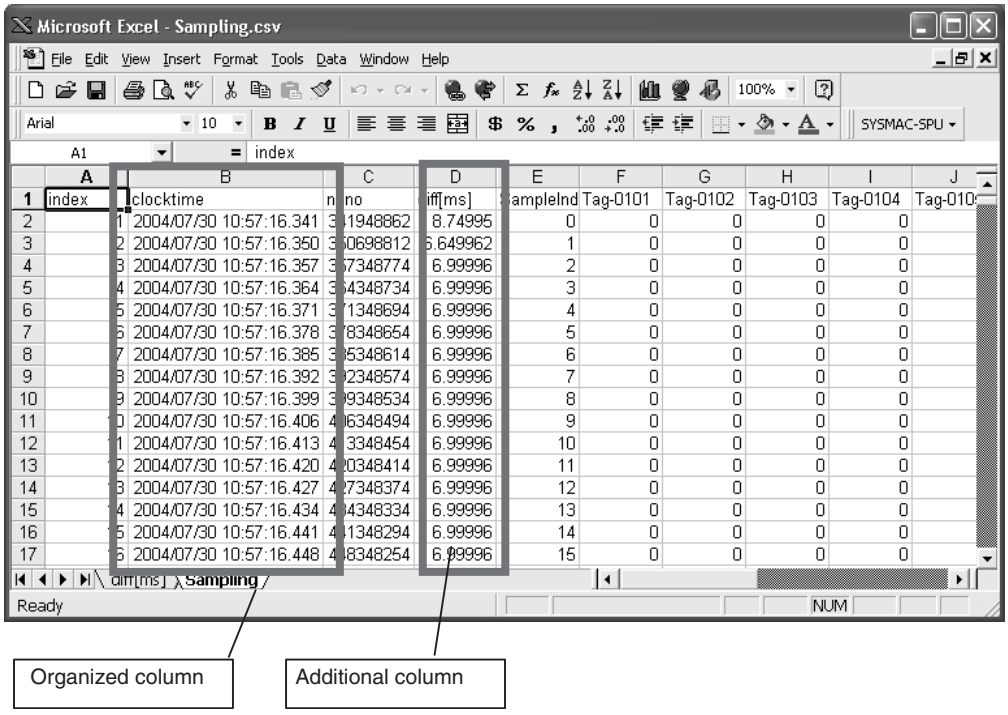
1,2,3... 1. Double-click the CSVFormatter.xls file in the Journal folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a toolbar called SYSMAC-SPU to the Excel toolbars.
It may not be possible to execute this macro depending on the settings of Excel security. If the macro cannot be executed, select ***Options - Macro Security - Security Level*** from the Excel menus and set the security level to ***Medium.***



	A	B	C	D	E	F	G	H	I	J	K
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105	Tag-0106	Tag-0107
2	1	57:16.3	3.42E+08	0	0	0	0	0	0	0	0
3	2	57:16.3	3.51E+08	1	0	0	0	0	0	0	0
4	3	57:16.4	3.57E+08	2	0	0	0	0	0	0	0
5	4	57:16.4	3.64E+08	3	0	0	0	0	0	0	0
6	5	57:16.4	3.71E+08	4	0	0	0	0	0	0	0
7	6	57:16.4	3.78E+08	5	0	0	0	0	0	0	0
8	7	57:16.4	3.85E+08	6	0	0	0	0	0	0	0
9	8	57:16.4	3.92E+08	7	0	0	0	0	0	0	0
10	9	57:16.4	3.99E+08	8	0	0	0	0	0	0	0
11	10	57:16.4	4.06E+08	9	0	0	0	0	0	0	0
12	11	57:16.4	4.13E+08	10	0	0	0	0	0	0	0
13	12	57:16.4	4.2E+08	11	0	0	0	0	0	0	0
14	13	57:16.4	4.27E+08	12	0	0	0	0	0	0	0
15	14	57:16.4	4.34E+08	13	0	0	0	0	0	0	0
16	15	57:16.4	4.41E+08	14	0	0	0	0	0	0	0
17	16	57:16.4	4.48E+08	15	0	0	0	0	0	0	0

2. Click the **SYSMAC-SPU** Button on the toolbar and select ***Formatting.***

   After this procedure is performed, the time display will be organized and the *diff[ms]* column will be displayed as shown below.



15-11 Saving Collection Data

Collection data collected by the SYSMAC SPU Unit can be saved in one file. The file will contain the data collection settings, all collection files, and the SYSMAC SPU Unit operating status in a compressed format. This file can be used to save specific collection results.

- Save the data to a file by executing command 03 (Save the Collection Data).
- The file will be saved in the SYSMAC SPU Unit network-shared folder \pccards\PCCard1\Archive with a timestamp for a name and the file name extension tgz (example: 20040727150505.tgz).
- The file that is saved is in tar and gzip format.
- The files inside the saved file can be accessed with the functions of Windows XP. With Windows 2000, compression software, such as WinZip, is required to unpack the files.

Note When command 03 (Save the Collection Data) is executed on the SYSMAC SPU Unit, a temporary file is created when creating the file to save. Saving the file may fail if there is not sufficient memory on the PC card.
As a guide, available space will be required that is equivalent to the total size of all of the collection files.

SECTION 16
Trend Graphs

This section provides information on operating trend graphs for data collection.

16-1 Historical Trends

The historical trends in Data Storage Mode are the same as for Sampling Mode. For details on operation methods, refer to *10-1 Historical Trends*.

SECTION 17
Unit Settings

This section provides information on Unit settings for data collection.

17-1 Unit Settings

The unit settings in Data Storage Mode are the same as for Sampling Mode. For details on operation methods, refer to *SECTION 11 Unit Settings*.

SECTION 18
Data Storage Mode Commands

This section provides a list of the commands that are supported by the SYSMAC SPU Unit in Data Storage Mode.

18-1 List of Data Storage Mode Commands

SYSMAC SPU Unit commands can be executed from SPU-Console, using SYSMAC SPU Unit switches, or from the CPU Unit memory. For details on command execution methods, refer to *SECTION 6 Executing Commands*. The SYSMAC SPU Unit commands that are supported depend on the operating mode.

The following table lists the commands that are supported when SPU-Console is in Data Storage Mode.

Command No.	Command	Meaning
01	Start the Basic Collection	Starts basic collection.
02	Stop the Basic Collection	Stops basic collection.
03	Save the collection data	Saves the collection data files and settings file in zip format.
04	Clear the collection data	Deletes the contents of the data files.
05	Display the IP address (LAN1)	Displays the IP address of LAN1 on the 7-segment display.
06	Display the IP address (LAN2)	Displays the IP address of LAN2 on the 7-segment display.
07	Display the unit name	Displays unit name on the 7-segment display.
08	Display the FINS address	Displays the FINS address of the Ethernet Communications Unit on the 7-segment display.
09	Display of PC card used space (%)	Displays the percentage of the PC card that has been used.
10	Error display	Displays any current error.
11	Forced clear of error	Deletes the record of any current errors.
12	Restart unit	Restarts the SYSMAC SPU Unit.
20	Change the data collection settings	Changes the data collection settings.
21	Back up the data collection settings	Backs up the data collection settings. This command must be executed beforehand to enable using the Recover the Data Collection Settings command.
22	Recover the data collection settings	Restores the data collection settings that were backed up.
24	Change the unit settings	Changes the unit settings.
25	Undo the unit setting changes	Undoes changes to the unit settings.
26	Change the scheduler setting	Changes the Scheduler settings.
30	Start the serial terminal	Used for maintenance. Do not execute this command.
31	Format the PC card (FAT32)	Formats the PC card in FAT32 format. All the files in the PC card will be deleted.
32	Clear the Logfile	Deletes the system log. Used for maintenance.
33	Processing information record	Used for maintenance. Do not execute this command.
50	Start the Basic Collection	Starts the basic collection.
51	Stop the Basic Collection	Stops the basic collection.
90 to 99	Execute the external command (90 to 99)	Executes the file SpuCommand<*No.*>.sh in the PC card.

Appendix A
Troubleshooting with Error Codes

The SYSMAC SPU Unit provides program numbers, error codes, and error details for each program. There are two ways to check for current errors.

1. Displaying Error Information on the SPU-Console
   Display the Error Information Panel on the Unit Information Tab Page of the SPU-Console.
2. Executing Command 10 (Error Display)

   Errors will be displayed on the 7-segment display in the order they occurred. The display will change as follows: Program number (2 digits) → __ (underbar) → Error code (two digits).

The main error and corrections for them are listed in the following table.

Error code	Message	Assumed cause	Correction
0x17	Failed to read the event memory.	Access was not possible to the CS1 bus.	Correct the error according to the error content of the program FGW-CS1BUS displayed in the Error Information Panel of the SPU-Console.
0x18	Failed to write the event memory.	Access was not possible to the CS1 bus.	
0x20	Cannot execute the operation within a sampling interval.	This error is recorded when sampling cannot be performed within the time set for realtime sampling. This is not a fatal error.	Increase the realtime sampling period. Reduce the load caused by other sampling (e.g., the sampling cycle or number of variables).
0x36	Failed to initialize the recorder.	Access was not possible to the CS1 bus.	Correct the error according to the error content of the program FGW-CS1BUS displayed in the Error Information Panel of the SPU-Console.
0x3D	Data transfer failed because writing a file is busy.	The cycle is too fast or too much data is being sampled, making it impossible to write the file.	Increase the cycle. Reduce the number of variables. Use a high-speed memory card.
0x44	No file found.	A file could not be found for execution.	Execute command 20 (Change the Sampling Settings, or Change the Data Collection Settings) again. Send the setting again and then execute command 20 (Change the Sampling Settings, or Change the Data Collection Settings).
0x45	Failed to load document.	There is a problem in the settings file.	Send the setting again and then execute command 20 (Change the Sampling Settings). Restore the sampling settings that were backed up. Executing the Initialization Wizard from the SPU-Console.
		The number of variables or the number of collected variables is too large.	Reduce the number of variables or the number of collected variables.
0x59	Sampling setting file format error.	There is a problem in the settings file.	Check to be sure that variables registered in the collection pattern are set correctly. Send the setting again and then execute command 20 (Change the Sampling Settings). Restore the sampling settings that were backed up. Executing the Initialization Wizard from the SPU-Console.

Error code	Message	Assumed cause	Correction
0x5B	Failed to open a journal.	A file to save data could not be created.	Insert a Memory Card into the PC card slot and be sure the CARD indicator is lit. Make sure the Memory Card is formatted in the FAT32 format. Make sure the Memory Card has sufficient capacity.
0x5D	No free space in storage.	There is not sufficient space available in the Memory Card.	Make sure the Memory Card has sufficient capacity.
0x7E	Not enough free space for saving sampling data.	There is not sufficient space available in the Memory Card.	Make sure the Memory Card has sufficient capacity.
0x82	There are a lot of numbers of channels of sampling settings.	There are too many variable words to be collected or too many memory areas.	Reduce the number of variables or variable elements.

Appendix B
Troubleshooting Connections

The SPU-Console connects to the SYSMAC SPU Unit through FINS communications and through the Windows network-shared folder. This section describes troubleshooting when the SPU-Console cannot connect to the SYSMAC SPU Unit.

General Network and Network-shared Folder Troubleshooting

If a warning dialog box saying “A network share folder cannot be connected” appears on the SPU-Console or if too much time is required for connection, there may be problems on the network or in the Windows network-shared folder.

The main problems and corrections for them are listed in the following table.

Problem	Assumed cause	Correction
The SPU-Console warning dialog box saying “A network share folder cannot be connected” is displayed.	Login failed when user authorization was enabled.	Close all programs that open the shared folder and access the SYSMAC SPU Unit network-shared folder from the Explorer. Then start the SPU-Console again.
Access is possible with the IP address but not with the unit name.	The SYSMAC SPU Unit network functions have not finished starting.	Wait for a while and then try accessing the SYSMAC SPU Unit again.
	Login failed when user authorization was enabled.	Close all programs that open the shared folder and access the SYSMAC SPU Unit network-shared folder from the Explorer. Then start the SPU-Console again.
	Time is required to search for the unit name because a proxy server is enabled.	Turn OFF the Windows proxy server. OR, do not use a proxy to search for the SYSMAC SPU Unit. The Windows proxy server setting can be changed under the following from Internet Explorer: ***Tools - Internet Options - Connections Tab - LAN Settings.***
Time is required to connect.	Time is required to search for the unit name because a proxy server is enabled.	Turn OFF the Windows proxy server. OR, do not use a proxy to search for the SYSMAC SPU Unit. The Windows proxy server setting can be changed under the following from Internet Explorer: ***Tools - Internet Options - Connections Tab - LAN Settings.***
	Connection is not possible because the sampling load is too high.	Stop sampling and then connect the SPU-Console.

Problem	Assumed cause	Correction
Connection is not possible. The connection is not stable.	The unit name is wrong.	Check the unit name. The unit name can be checked by executing command 07 (Display the Unit Name).
	The IP address is wrong.	Check the IP address. The IP address can be checked by executing command 05 (Display the IP address (LAN1)).
	A firewall is running on the computer.	Set the firewall to enable using the IP address of the SYSMAC SPU Unit. Refer to user documentation provided with your software for details.
	The same IP address is used by another node on the LAN.	Do not use the same IP address more than once on the same LAN.
	There is a problem with the cable or hub.	Check the LAN indicator on the front of the SYSMAC SPU Unit to see if it is lit or flashing. (A problem exists if the LAN indicator is not lit.)
	A cross cable is being used, but communications settings do not agree between the computer and SYSMAC SPU Unit.	Try changing the baud rate of the network card driver on the computer from 100M to 10M.

Troubleshooting FinsGateway

If a message saying that communications with the SYSMAC SPU Unit are not possible is displayed in the SPU-Console's Guide Panel, there may be a problem with FINS communications. The SPU-Console can communicate with SYSMAC SPU Units using the FinsGateway ETN_UNIT service.

The main problems and corrections for them are listed in the following table.

Problem	Assumed cause	Correction
Communications are not possible with an SYSMAC SPU Unit on the same Ethernet network.	The ETN_UNIT FINS-IP address conversion method is set to use the IP address table.	Set *FINS-IP Conversion* in the *ETN_UNIT Properties* of the *OMRON FinsGateway Settings* Program to *Automatic Generation (Dynamic).*
Communications are not possible with an SYSMAC SPU Unit through a router.	The ETN_UNIT FINS-IP address conversion method is set to use automatic generation.	Set *FINS-IP Conversion* in the *ETN_UNIT Properties* of the *OMRON FinsGateway Settings* Program to *IP Address Table.*
	The IP address is not registered in the IP address table.	Click the **Advanced** Button in the SPU-Console's Destination Setting Panel and select *Register for the Ethernet IP address table.* Refer to *5-2-5 Advanced Settings.*
Communications are not possible with an SYSMAC SPU Unit from a computer with more than one network card.	The priority settings for the network cards are not correct.	Set the *Primary Network Card* in the *ETN_UNIT Properties* of the *OMRON FinsGateway Settings* Program to the network card of the network to which the SYSMAC SPU Unit is connected.
Network services other than ETN_UNIT are being used.	The FINS network address of ETN_UNIT is set to 0.	Set the same network address as the one used by the SYSMAC SPU Unit in the *ETN_UNIT Properties* of the *OMRON FinsGateway Settings* Program.
The ETN_UNIT network address is not set to 2.	The ETN_UNIT network address is different from the SYSMAC SPU Unit network address.	The SYSMAC SPU Unit network address is factory set to 2. Set the same network address as the one used by the SYSMAC SPU Unit in the *ETN_UNIT Properties* of the *OMRON FinsGateway Settings* Program.
The SYSMAC SPU Unit FINS-IP address conversion method is not set to use automatic generation.	The computer's IP address is not registered in the SYSMAC SPU Unit's IP address table, or it is registered incorrectly.	With the SYSMAC SPU Unit's Ethernet FINS network setting, correctly register the computer's IP address and the FinsGateway ETN_UNIT node address in the IP address table.
	The FINS address is incorrectly set in the destination setting.	Click the **Advanced** Button in the SPU-Console's Destination Setting Panel, and correctly register the SYSMAC SPU Unit's FINS address.

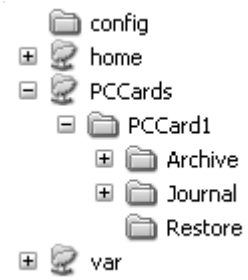
Select ***Start - All Program - FinsGateway - FinsGateway Setting.*** Refer to the online help for the FinsGateway Setting program that is started for operating methods.

Appendix C

Structure of the Network-shared Folder

The sampling files, setting files, and other files can be accessed from the computer using a Windows network-shared folder.

The structure of the SYSMAC SPU Unit network folder is shown below.



Folder	Contents
config	Contains the variable settings, sample settings, and other settings files.
home	A user folder
PCCards/PCCard1	The PC card folder.
PCCards/PCCard1/Journal	Contains record files.
PCCards/PCCard1/Archive	Contains saved settings.
PCCards/PCCard1/Restore	Contains the backup settings for restoration.
var	Contains system log files.

Appendix D
Changing from SYSMAC SPU Unit Ver. 1.0/1.2

Connecting to the SYSMAC SPU Unit Ver. 1.0/1.2

When connecting to the SYSMAC SPU Unit Ver. 1.0/1.2, the setting screen for SPU-Console Ver. 1.0/1.2 is displayed. For details on operating the SPU-Console Ver. 1.0 setting screen, refer to *SYSMAC WS02-SPTC1 SPU-Console Operation Manual* (V230). SPU-Console Ver. 1.2 setting screen operations are the same as for SPU-Console Ver. 1.3.

Note Connection to the SYSMAC SPU Unit Ver. 1.3 from SPU-Console Ver. 1.0/1.2 is not possible. Use SPU-Console Ver. 1.3 to connect to SYSMAC SPU Unit Ver. 1.3.

Moving Setting Files

Use the following procedure to use SYSMAC SPU Unit Ver. 1.0/1.2 settings with an SYSMAC SPU Unit Ver. 1.3.

1. Select ***File - Connect***, and connect to the SYSMAC SPU Unit Ver. 1.0/1.2 in which the settings files are located.
2. Select ***File - Save to PC*** and save the Ver. 1.0/1.2 settings files to the personal computer.
3. Select ***File - Connect***, and connect to the SYSMAC SPU Unit Ver. 1.3 to which the settings files are to be moved.
4. Select ***File - Load from PC*** and load the Ver. 1.0 settings files saved in step 2.
5. Confirm the settings in the Sampling Settings (or Collection Settings Tab Page).
6. Click the **Transfer to Unit** Button to change the SYSMAC SPU Unit Ver. 1.3 settings.

Note (1) Do not recover backup settings by executing command 21 (Back Up the Sampling Settings or Back Up the Data Collection) using a different version of the SYSMAC SPU Unit. Otherwise, the SYSMAC SPU Unit will not operate normally.

(2) SYSMAC SPU Unit Ver. 1.3 settings cannot be used with an SYSMAC SPU Unit Ver. 1.0. Do not transfer settings from an SYSMAC SPU Unit Ver. 1.3 to an SYSMAC SPU Unit Ver. 1.0.

Refreshing System Programs with Ver. 1.3

The SYSMAC SPU Unit Ver. 1.0/1.2 system program can be refreshed in Ver. 1.3. For details on the system program refresh procedure, refer to *Appendix E Refreshing the System Program*.

Appendix E
Refreshing the System Program

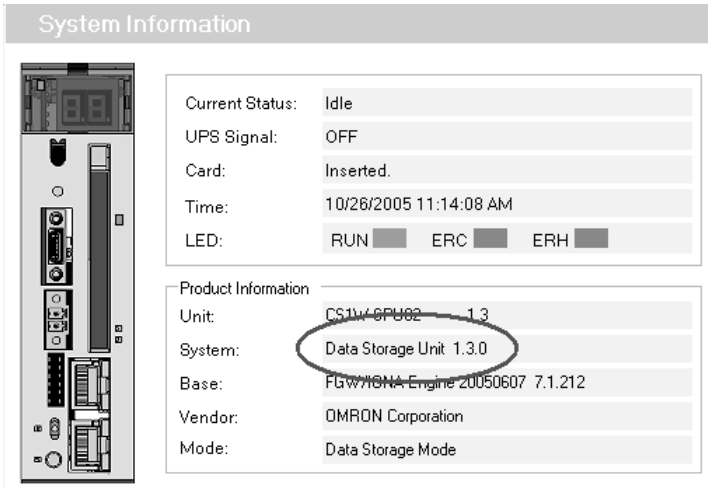
Refreshing the System Program

The procedure for refreshing the SYSMAC SPU Unit system program is explained here. The procedure is explained using an example of refreshing an SYSMAC SPU Unit Ver. 1.0/1.2 system program to Ver. 1.3.

A Memory Card is used to refresh the system program. Transfer the system data to be refreshed to the Memory Card, mount the Memory Card containing the refresh data in the SYSMAC SPU Unit and start the SYSMAC SPU Unit to execute refreshing.

Note (1) All the settings will be initialized when the system program is refreshed. If required, execute ***Save to PC*** from the SPU-Console to back up the settings files.

(2) The system program version can be confirmed in the SPU-Console's Unit Information.



(3) To refresh the system program, the SYSMAC SPU Unit must be restarted. For details on restarting the SYSMAC SPU Unit only without turning OFF the power to the CPU Unit, refer to *3 -4 Restarting the SYSMAC SPU Unit* in the *SYSMAC SPU Unit Operation Manual* (V229).

System Program Refresh Procedure

Step 1: Preparation

Prepare a Memory Card with at least 32 MB formatted in FAT32. Make sure that the Memory Card does not contain important files. The Memory Card can be formatted using SYSMAC SPU Unit command 31 (PC card format (FAT32)). System programs for refreshing are transferred via Ethernet. A network environment and personal computer that can be connected to the SYSMAC SPU Unit are required.

1. Mount the prepared Memory Card in the SYSMAC SPU Unit.
2. Turn ON DIP switch pins 4 and 6 only. Turn OFF all other DIP switch pins.
3. Restart the SYSMAC SPU Unit in Maintenance Mode. The SYSMAC SPU Unit's IP address will be 192.168.0.100. For details, refer to *3-3 Starting the SYSMAC SPU Unit in Maintenance Mode*.
4. Set the personal computer's IP address to 192.168.0.*. For details, refer to *3-4 Setting the IP Address of the Computer*.

Step 2: Transferring System Data to the Memory Card

1. Select ***Start - All Program - OMRON - SPU-Console 1.2 - System Program Update***.
2. Check that the preparation in Step 1 is completed, and click the **Continue** Button.
3. Click the **Execute** Button for SYSMAC SPU Version 1.3. The system program data will be transferred to the Memory Card.

Note (1) While system program data for refreshing is being transferred to the Memory Card, make sure that SYSMAC SPU Unit power is not turned OFF and that the LAN cable is not disconnected. Otherwise, transfer to the Memory Card will fail. In this situation, perform step 2 again.

(2) A similar procedure can be used to return the SYSMAC SPU Unit to Ver. 1.0 or Ver. 1.2 after it has been refreshed with Ver. 1.3. For this procedure, click the **Execute** Button for SYSMAC SPU Version 1.0 or 1.2.

4. Exit the program when the procedure is completed.

Step 3. Refreshing the System Program

1. Mount the Memory Card created in step 2 in the SYSMAC SPU Unit.
2. Turn ON the SYSMAC SPU Unit's DIP switch pins 1, 4, and 6 only. Turn OFF all other DIP switch pins.
3. Restart the SYSMAC SPU Unit. The system program will automatically start refreshing when the Unit is restarted.
   When refresh begins, an "S" will be displayed by the 7-segment display, followed by the numeral indicating progress. Refreshing the system program requires approximately two minutes. When refreshing is completed, an "F" is displayed by the 7-segment display.
4. Return the SYSMAC SPU Unit's DIP switch pins to their original positions.

Note (1) When system program refreshing is finished, until "F" is displayed by the 7-segment display, be sure not to turn OFF the power to the SYSMAC SPU Unit. Otherwise, the SYSMAC SPU Unit will not operate normally.

(2) Format to clear the contents of the Memory Card used to refresh the system program.

Step 4. Initializing the SYSMAC SPU Unit Settings

After refreshing the system program, the IP address settings are initialized. Be sure to initialize the settings of the SYSMAC SPU Unit before use. For details on initializing settings, refer to *3-5 Making the Initial Settings for the SYSMAC SPU Unit*.

Appendix F
Reproducing a SYSMAC SPU Unit

This section describes how to reproduce a SYSMAC SPU Unit, i.e., how to create a new SYSMAC SPU Unit with the same settings as an existing SYSMAC SPU Unit.

To reproduce a SYSMAC SPU Unit, use a Memory Card. The existing SYSMAC SPU Unit's settings can be saved to a Memory Card, and then the settings can be copied to a new SYSMAC SPU Unit. This enables copying the settings without using the SPU-Console.

Step 1: Preparing a Memory Card for Reproduction

Prepare a Memory Card of at least 32 MB formatted for FAT32. Check to confirm that there are no important files stored on the Memory Card.

1. Insert the Memory Card in the SYSMAC SPU Unit that is to be reproduced.
2. Turn ON DIP switch pins 4 and 6 on the SYSMAC SPU Unit and turn OFF all the other DIP switch pins.
3. Restart the SYSMAC SPU Unit. It will start in Maintenance Mode. Refer to *3-3 Starting the SYSMAC SPU Unit in Maintenance Mode*.
4. Select command 21 using the **SELECT** Switch on the front of the SYSMAC SPU Unit, and then press the **ENTER** Button.
5. The 7-segment display will display in order from "C1" to "CF." When "---" is displayed, the Memory Card is ready (i.e., the settings have been copied to it).
6. Turn OFF the power to the SYSMAC SPU Unit.
7. Remove the Memory Card.
8. Return the DIP switch pins to their original settings.

Step 2: Copying the Settings to a New SYSMAC SPU Unit

Copy the settings to a new SYSMAC SPU Unit using the Memory Card prepared in Step 1.

1. Insert the Memory Card prepared in Step 1 into the new SYSMAC SPU Unit.
2. Turn ON DIP switch pins 4 and 6 on the SYSMAC SPU Unit and turn OFF all the other DIP switch pins.
3. Restart the SYSMAC SPU Unit. It will start in Maintenance Mode. Refer to *3-3 Starting the SYSMAC SPU Unit in Maintenance Mode*.
4. Select command 22 using the **SELECT** Switch on the front of the SYSMAC SPU Unit, and then press the **ENTER** Button.
5. The 7-segment display will display in order from "R1" to "RF." When "---" is displayed, copying the settings to the new SYSMAC SPU Unit has been completed.
6. Turn OFF the power to the SYSMAC SPU Unit.
7. Remove the Memory Card.
8. Return the DIP switch pins to their original settings.

Note (1) If the copy operation fails, "ER" will be displayed by the 7-segment display on the front panel of the SYSMAC SPU Unit and the copy will not be executed. (The settings will remain the same as before the copy.) If this happens, start over from *Step 1: Preparing a Memory Card for Reproduction*.

(2) To compare the contents of the Memory Card used to copy the settings with the settings in the new SYSMAC SPU Unit, execute command 23. If the settings are the same, "VF" will be displayed, and if differences are detected, "NG" will be displayed. If "NG" is displayed, start over from *Step 1: Preparing a Memory Card for Reproduction*.

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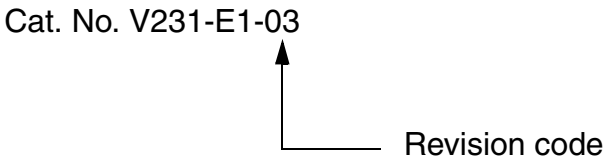
Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
01	June 2005	Original production
02	November 2005	Revised to include support for CJ-series CJ1W-SPU-O1 SYSMAC SPU Unit and unit version 1.3 for CS-series SYSMAC SPU Units. Page vi: Information added on unit versions. Pages xx to xxii: Changes made to precautions. Page 5: Information changed on unit versions. Page 29: Information added on checking connections. Page 32: Information added on importing and exporting registrations. Page 83: Information on IP routing changed. Page 84: Information changed on power failure signals. Page 87: Information added on routing tables. Page 144: Information added to error codes. Page 146: Information added to FinsGateway troubleshooting table. Page 149: Information added on version changes. Page 152: Changes made to system program refresh procedure. Page 153: Information added on reproducing SYSMAC SPU Units.
03	August 2006	Revised to include changes to the startup windows, which are part of the upgrade to SPU Console version 1.32.

OMRON Corporation
Technology Development Center H.Q.
Shiokoji Horikawa, Shimogyo-ku,
Kyoto, 600-8530 Japan
Tel: (81)75-344-7123/Fax: (81)75-344-7172

Regional Headquarters

OMRON EUROPE B.V.
Wegalaan 67-69, NL-2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC
1 East Commerce Drive, Schaumburg, IL 60173
U.S.A.
Tel: (1)847-843-7900/Fax: (1)847-843-8568

OMRON ASIA PACIFIC PTE. LTD.
83 Clemenceau Avenue,
#11-01, UE Square,
Singapore 239920
Tel: (65)6835-3011/Fax: (65)6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120 China
Tel: (86)21-5037-2222/Fax: (86)21-5037-2200

OMRON

Authorized Distributor:

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