FANUC Series 30*i*-MODEL A/B
FANUC Series 31*i*-MODEL A/B
FANUC Series 32*i*-MODEL A/B
FANUC Series 35*i*-MODEL B
FANUC Power Motion *i*-MODEL A
FANUC Series 0*i*-MODEL F

Fast Ethernet
Fast Data Server

OPERATOR'S MANUAL

B-64014EN/07

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In this manual we have tried as much as possible to describe all the various matters.
However, we cannot describe all the matters which must not be done, or which cannot be done, because there are so many possibilities.
Therefore, matters which are not especially described as possible in this manual should be regarded as "impossible".

This manual contains the program names or device names of other companies, some of which are registered trademarks of respective owners. However, these names are not followed by ® or ™ in the main body.

SAFETY PRECAUTIONS

"SAFETY PRECAUTIONS" describes the safety precautions related to the use of CNC units, to ensure safe operation of machines fitted with FANUC CNC units. Read this section carefully before attempting to use any function described in this manual.
Users should also read the relevant descriptions in the Operator's Manual of the CNC to become fully familiar with the functions to be used.

Contents

DEFINITION OF WARNING, CAUTION, AND NOTE s-1
GENERAL WARNINGS AND CAUTIONS s-2
GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT s-3

DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

⚠ **WARNING**
Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠ **CAUTION**
Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.

GENERAL WARNINGS AND CAUTIONS

⚠ WARNING

1 Before operating the machine, thoroughly check the entered data. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

2 Never attempt to machine a workpiece without first checking the programmed value, compensation value, current position, and external signal settings. Also, never attempt to machine a workpiece without first checking the operation of the machine. Before starting a production run, ensure that the machine is operating correctly by performing a trial run using, for example, the single block, feedrate override, or machine lock function, or by operating the machine with neither a tool nor workpiece mounted. Failure to confirm the correct operation of the machine may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

3 Ensure that the specified feedrate is appropriate for the intended operation. Generally, for each machine, there is a maximum allowable feedrate. The appropriate feedrate varies with the intended operation. Refer to the manual provided with the machine to determine the maximum allowable feedrate. If a machine is turn at other than the correct speed, unexpected load may be applied to the machine, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

4 When using a tool compensation function, thoroughly check the direction and amount of compensation.
Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

5 The parameters for the CNC and PMC are factory-set. Usually, there is no need to change them. When, however, there is no alternative other than to change a parameter, ensure that you fully understand the function of the parameter before making any change.
A failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ CAUTION

1 Immediately after switching on the power, do not touch any of the keys on the MDI unit until the position display or alarm screen appears on the CNC unit.
Some of the keys on the MDI panel are dedicated to maintenance or other special operations. Pressing any of these keys may place the CNC unit in other than its normal state. Starting the machine in this state may cause it to behave unexpectedly.

2 The operator's manual for the CNC describes all the basic functions of the CNC, including the optional functions. The selected optional functions vary with the machine. Some functions described in this manual may not, therefore, be supported by your machine. Check the machine specifications before using the optional functions.

⚠ **CAUTION**

3 Some machine operations and screen functions are implemented by the machine tool builder. For an explanation of their usage and related notes, refer to the manual provided by the machine tool builder.
For example:
- On some machines, executing a tool function causes the tool change unit to operate. When executing a tool function on such a machine, stand well clear of the tool change unit. Otherwise, there is a danger of injury to the operator.
- Many auxiliary functions trigger physical operations, such as rotation of the spindle. Before attempting to use an auxiliary function, therefore, ensure that you are fully aware of the operation to be triggered by that function.

NOTE

Command programs, parameters, and variables are stored in nonvolatile memory in the CNC. Generally, the contents of memory are not lost by a power on/off operation. However, the contents of memory may be erased by mistake, or important data in nonvolatile memory may have to be erased upon recovering from a failure.
To enable the restoration of data as soon as possible if such a situation arises, always make a backup of the data in advance.

GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT

⚠ **WARNING**

Be careful enough for the following warnings when you develop two or more applications or use networks.
If you neglect them, there is a danger of the user being injured or there is a danger of both the user being injured and the equipment being damaged.

1 Be careful enough if you write an identical CNC data, an identical PMC data or a series of related data set by two or more above applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the data will be written in an unexpected order.
Therefore, do NOT write above data in the following cases.
- Applications and network functions
- Two or more applications
- Two or more network functions

Data, applications and network functions of interest are listed in below. However, all may not be listed completely because new features will be added in the future.

2 Be careful enough that you must prevent PMC signals in the same byte from being written by the following two or more applications including network functions. While an application reads and writes one byte of PMC signals, other applications may write the same byte.

3 Be careful enough if you process a PMC signal set that is related to a CNC function by using the following two or more applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the CNC may receive the PMC signal set in an unexpected order.

⚠ **WARNING**

4 Generally, when multi-byte data are read or written at once among the following two or more applications including network functions, the coherency of the read multi-byte data (in other words, reading all latest data at once) is not guaranteed. To ensure the coherency of the multi-byte data, prepare flags to notify the completion of reading or writing process that is separated from the entity of the data and make the handshaking process to access the data by using the flags.

Data List Table

Category	Data
General data for CNC	Parameter, Tool compensation value and related data, Work zero offset value and related data, Workpiece coordinate system shift value and related data, Macro variable, P-CODE variable, Program and related data, Tool management function data, Tool life management data, Error compensation related data , Overtravel check (Interference check) related data , Software operator's panel related data
PMC data	PMC signal, PMC parameter
Data for Laser, Punch press or Wire cut	Tool data for punch press and related data, Safety zone data and related data, Laser cutting condition data and related data, Laser oscillator setting data and related data, Wire consumption compensation data, Guide position compensation data, Workpiece leveling data
Other data	Parameters for Data Server, Parameters for network setting

List Table of Applications and Network Functions

Category	Functions
Applications	PMC Ladder, Macro Executor, C Language Executor, FANUC PICTURE, FOCAS2
Network functions	FL-net, EtherNet/IP, PROFINET, Modbus/TCP, PROFIBUS-DP, DeviceNet, CC-Link

5 CNC has functions that read or write PMC signals in other than the G/F address. Be careful enough if the above mentioned applications and network read or write PMC signals used by these functions. When reading or writing the same PMC signal, applications or CNC functions may work in an unexpected manner.
For the relevant CNC functions, refer to "LIST OF FUNCTIONS USING PMC SIGNALS OTHER THAN G/F ADDRESS " in Appendix in the CONNECTION MANUAL (FUNCTION) of the relevant CNC.

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ADDITIONAL INFORMATION

I. GENERAL

1 GENERAL

This chapter explains the organization of this manual and how to read this manual.

1.1 ORGANIZATION

This manual consists of the following parts:

SAFETY PRECAUTIONS
This section describes the precautions to be observed when reading this manual.

I. GENERAL
This part describes the chapter organization, applicable models, and related manuals.

II. SPECIFICATION
This part describes the specifications of the functions that operate on the Fast Ethernet/Fast Data Server.

III. SETTING
This part describes the method of setting.

IV. OPERATION
This part describes the method of operating the Data Server functions, machine remote diagnosis functions, and FTP file transfer function.

V. CONNECTION
This part describes the method of connection and provides notes.

VI. MAINTENANCE
This part describes hardware and software maintenance information.

APPENDIX
These appendixes describe additional information such as that related to troubleshooting, the operation of the FTP client, and how to set up the FTP server.

1.2 APPLICABLE MODELS

This Operator's Manual covers the following models.
The abbreviations in the following table are sometimes used in text descriptions.

<table>
<tr><th>Model name</th><th colspan="4">Abbreviation</th></tr>
<tr><td>FANUC Series 30i-MODEL A</td><td>Series 30i-A</td><td colspan="2" rowspan="3">Series 30i/31i/32i-A</td><td colspan="2" rowspan="9">Series 30i/31i/32i-A/B, 35i-B, PMi-A</td></tr>
<tr><td>FANUC Series 31i-MODEL A</td><td rowspan="2">Series 31i-A</td></tr>
<tr><td>FANUC Series 31i-MODEL A5</td></tr>
<tr><td>FANUC Series 32i-MODEL A</td><td>Series 32i-A</td></tr>
<tr><td>FANUC Series 30i-MODEL B</td><td>Series 30i-B</td><td rowspan="4">Series 30i/31i/32i-B</td><td rowspan="4">Series 30i/31i/32i/35i-B or 30i/31i/32i/35i-B</td></tr>
<tr><td>FANUC Series 31i-MODEL B</td><td rowspan="2">Series 31i-B</td></tr>
<tr><td>FANUC Series 31i-MODEL B5</td></tr>
<tr><td>FANUC Series 32i-MODEL B</td><td>Series 32i-B</td></tr>
<tr><td>FANUC Series 35i-MODEL B</td><td>Series 35i-B</td><td>Series 35i-B</td></tr>
<tr><td>FANUC Power Motion i-MODEL A</td><td>Power Motion i-A</td><td>Power Motion i-A</td><td>PMi-A</td></tr>
<tr><td>FANUC Series 0i-MODEL F</td><td>Series 0i-F</td><td>Series 0i-F</td><td>Series 0i-F</td><td>0i-F</td></tr>
</table>

1.3 RELATED MANUALS

The table below lists manuals related to this manual.
Refer to these manuals when you use this manual. This manual is indicated by an asterisk(*).

Manual name	Specification number	
Related to Series 30*i*/31*i*/32*i*-A		
DESCRIPTIONS	B-63942EN	
CONNECTION MANUAL (HARDWARE)	B-63943EN	
CONNECTION MANUAL (FUNCTION)	B-63943EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-63944EN	
OPERATOR'S MANUAL (For Lathe System)	B-63944EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-63944EN-2	
MAINTENANCE MANUAL	B-63945EN	
PARAMETER MANUAL	B-65950EN	
Related to Series 30*i*/31*i*/32*i*-B		
DESCRIPTIONS	B-64482EN	
CONNECTION MANUAL (HARDWARE)	B-64483EN	
CONNECTION MANUAL (FUNCTION)	B-64483EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64484EN	
OPERATOR'S MANUAL (For Lathe System)	B-64484EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64484EN-2	
MAINTENANCE MANUAL	B-64485EN	
PARAMETER MANUAL	B-64490EN	
Related to Series 35*i*-B		
DESCRIPTIONS	B-64522EN	
CONNECTION MANUAL (HARDWARE)	B-64523EN	
CONNECTION MANUAL (FUNCTION)	B-64523EN-1	
OPERATOR'S MANUAL	B-64524EN	
MAINTENANCE MANUAL	B-64525EN	
PARAMETER MANUAL	B-64530EN	
Related to Power Motion *i*-A		
DESCRIPTIONS	B-64572EN	
CONNECTION MANUAL (HARDWARE)	B-64573EN	
CONNECTION MANUAL (FUNCTION)	B-64573EN-1	
OPERATOR'S MANUAL	B-64574EN	
MAINTENANCE MANUAL	B-64575EN	
PARAMETER MANUAL	B-64580EN	
Related to Series 0*i*-F		
DESCRIPTIONS	B-64602EN	
CONNECTION MANUAL (HARDWARE)	B-64603EN	
CONNECTION MANUAL (FUNCTION)	B-64603EN-1	
CONNECTION MANUAL (Series 0*i*-PF FUNCTION)	B-64623EN	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64604EN	
OPERATOR'S MANUAL (Series 0*i*-PF)	B-64624EN	
OPERATOR'S MANUAL (For Lathe System)	B-64604EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64604EN-2	
MAINTENANCE MANUAL	B-64605EN	
PARAMETER MANUAL	B-64610EN	
PARAMETER MANUAL (Series 0*i*-PF)	B-64630EN	
PMC		
PMC PROGRAMMING MANUAL (Series 30*i*/31*i*/32*i*-A)	B-63983EN	

Manual name	Specification number	
PMC PROGRAMMING MANUAL (Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	B-64513EN	
Network		
PROFIBUS-DP Board CONNECTION MANUAL	B-63993EN	
Industrial Ethernet CONNECTION MANUAL	B-64013EN	
Fast Ethernet / Fast Data Server OPERATOR'S MANUAL	B-64014EN	*
DeviceNet Board CONNECTION MANUAL	B-64043EN	
FL-net Board CONNECTION MANUAL	B-64163EN	
CC-Link Board CONNECTION MANUAL	B-64463EN	
Machine Remote Diagnosis		
Machine Remote Diagnosis Package OPERATOR'S MANUAL	B-63734EN	
PC Tool		
FANUC PROGRAM TRANSFER TOOL OPERATOR'S MANUAL	B-64344EN	

II. SPECIFICATION

1 PREFACE

⚠ **WARNING**
Fully understand the instructions described in this manual before starting operation. If you start operation before fully understanding them, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ **CAUTION**
1 If connecting to communication devices made by other companies, thoroughly read the manuals supplied with the communication devices made by the other companies and sufficiently conduct connection tests beforehand.
2 Be sure to read through this part, "SPECIFICATION".

1.1 HARDWARE ON WHICH Ethernet OPERATES

In a CNC system, Ethernet operates on the following hardware components.
This manual covers the hardware options listed below.

Embedded Ethernet

Embedded Ethernet is a built-in Ethernet circuit mounted on the main board or stand-alone type LCD unit supporting Windows CE.
(Connector name: CD38A or CD38S)

Hardware option

A hardware option is an Ethernet hardware component prepared as a CNC option.
There are the following two types of hardware options.

Kind	Description
Multi-function Ethernet	Fast Ethernet circuit mounted on the main board of the LCD-mounted type Series 30*i*/31*i*/32*i*/35*i*-B or LCD-mounted type Power Motion *i*-A (Connector name: CD38B) Multi-function Ethernet may be referred to as "Fast Ethernet".
Fast Ethernet board	Option board mounted in an optional slot (slots 1 to 4) (Connector name: CD38R) An option board on which an ATA Flash card or Compact Flash Card (referred to as a memory card below) is mounted to enable the Data Server functions to operate may be referred to as "Fast Data Server" or "Fast Data Server board". An option board on which no memory card is mounted may be referred to as "Fast Ethernet" or "Fast Ethernet board".

NOTE

Note the following restrictions on hardware options:

- The maximum number of hardware options that can be mounted is 3, including Multi-function Ethernet and/or Fast Ethernet boards. For the stand-alone type Series 35*i*-B, the stand-alone type Power Motion *i*-A and Series 0*i*-F, however, the maximum number of hardware options that can be mounted is 2.
- The Data Server function cannot be used on Multi-function Ethernet.
- The Data Server function cannot be used on the Series 35*i*-B or Power Motion *i*-A.
- Multi-function Ethernet cannot be used on a stand-alone type CNC or Series 0*i*-F.

1.2 COMMUNICATION FUNCTIONS OPERATING ON HARDWARE OPTIONS

The following communication functions can be operated on hardware options.

Communication function		Detailed in	Embedded Ethernet
Ethernet function / Data Server function	Data Server functions (Note 1)	Chapter 2 in this Part	Unavailable
	FOCAS2/Ethernet functions (Note 2)	Chapter 3 in this Part	Available
	DNS/DHCP functions (Note 3)	Chapter 4 in this Part	Available
	Machine remote diagnosis functions (Note 2)	Chapter 5 in this Part	Available (Note 6)
	Unsolicited messaging function (Note 2)	Chapter 6 in this Part	Available
	FTP file transfer function (Note 2)	Chapter 7 in this Part	Available
Industrial Ethernet (Note 4)	FL-net functions	FL-net Connection Manual (B-64163EN)	Unavailable
	EtherNet/IP functions	Industrial Ethernet Connection Manual (B-64013EN)	Unavailable
	Modbus/TCP functions		Available
	PROFINET functions		Unavailable

NOTE

1 To use the Data Server functions, the Data Server function option (S737) is required.
The string in the parentheses following the function option name indicates the last four digits of the ordering number of the function option. The same applies to the following description.

2 To use the FOCAS2/Ethernet functions, machine remote diagnosis functions, unsolicited messaging function, and FTP file transfer function, the Ethernet function option (S707) is required.

3 To use the DNS/DHCP functions, either of the Ethernet function option (S707) and Data Server function option (S737) is required.

4 To use Industrial Ethernet, refer to the relevant connection manual.

NOTE

5 For detailed information of the use of the embedded Ethernet, refer to the chapter titled "EMBEDDED Ethernet FUNCTION" in the relevant CNC maintenance manual. Note the following points:

- The number of FOCAS2/Ethernet clients that can be connected concurrently with the embedded Ethernet is smaller than that with the hardware option.

	Hardware option	Embedded Ethernet
Number of clients that can be connected concurrently	Up to 20	Up to 5
Number of PCs that can be connected concurrently	Up to 20	1 (recommended)

- To use the unsolicited messaging function on the embedded Ethernet in the Series 30*i*/31*i*/32*i*-A, the Enhanced Embedded Ethernet function option (R952) is required.
- Since communication using embedded Ethernet is processed by the CPU in the CNC, the CNC operation status may affect the communication performance of embedded Ethernet and communication using embedded Ethernet may also affect CNC processing.
  For example, since embedded Ethernet operates with priority lower than that given to automatic or manual operation performed for each axis, the communication rate may be slower during automatic operation or operation with many controlled axes.
  Meanwhile, since embedded Ethernet operates with priority higher than that given to the CNC screen display processing, C Language Executor (other than high-level tasks), and other processing, communication using embedded Ethernet may reduce the performance of the processing.
- Carefully connect embedded Ethernet to an intracompany network handling much broadcast data because broadcast data processing takes time, which may affect the performance of the CNC screen display processing and others.

6 The machine remote diagnosis function cannot be used on the embedded Ethernet in the Series 30*i*/31*i*/32*i*-A.

1.3 Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A AND Series 0*i*-F

With the Series 30*i*/31*i*/32*i*/35*i*-B and Power Motion *i*-A, Multi-function Ethernet or the Fast Ethernet board can be selected as the hardware option using NC parameters.
With the Series 0*i*-F, the Fast Ethernet board can be selected as the hardware option using NC parameters.

1.3.1 RELATED NC PARAMETERS

0970	Select hardware option that operates Ethernet or Data Server function

[Input type] Parameter input
[Data type] Byte
[Valid data range] -1 to 6
Hardware option that operates each function is selected.

Value	Hardware option	
-1	Not used	
0	Unsetting (initial value)	(NOTE 1)
1	Multi-function Ethernet	(NOTE 2)

Value	Hardware option
2	(reserved)
3	Fast Ethernet board mounted (slot1)
4	Fast Ethernet board mounted (slot2)
5	Fast Ethernet board mounted (slot3)
6	Fast Ethernet board mounted (slot4)

NOTE

1 When only one hardware option is mounted and no function option related to Industrial Ethernet is specified, parameter No. 970 need not be changed from 0 (initial value).

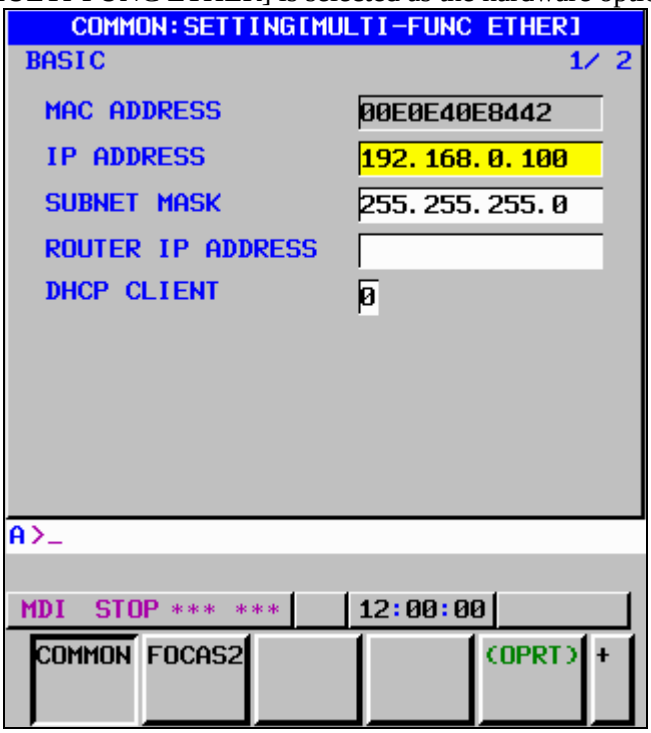
2 The Data Server function cannot be used on Multi-function Ethernet.
If the Data Server function option (S737) is specified, do not set 1 (Multi-function Ethernet) to parameter No. 970.
With a stand-alone type CNC or Series 0*i*-F, do not set 1 (Multi-function Ethernet) to parameter No. 970.

3 The Ethernet functions and Data Server functions cannot be used on different hardware options.

4 After changing parameter No. 970, turn the power off.
When parameter No. 970 is changed and the power is turned off, then on again, alarm PW0050, "POWER MUST BE OFF (INITIALIZED COMMUNICATION)" or alarm SR2038 "WRONG COMMUNICATION COMBINATION" may be issued.
If alarm PW0050 is issued, turn the power to the CNC off, then on again.
If alarm SR2038 is issued, see Section 2.6, "ALARM AND DIAGNOSIS INFORMATION" in Part VI, "MAINTENANCE" and review the setting.

1.3.2 Checking the Selected Hardware Option

With the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A and Series 0*i*-F, the selected hardware option can be confirmed in the title bar of the setting, maintenance, or log screen of each communication function.
In the example below, [MULTI-FUNC ETHER] is selected as the hardware option.



Title	Description
[MUTI-FUNC ETHER]	Fast Ethernet circuit mounted on the main board of the LCD-mounted type Series 30*i*/31*i*/32*i*/35*i*-B and LCD-mounted type Power Motion *i*-A
[BOARD(SLOT1)]	Fast Ethernet board mounted in the optional slot 1
[BOARD(SLOT2)]	Fast Ethernet board mounted in the optional slot 2
[BOARD(SLOT3)]	Fast Ethernet board mounted in the optional slot 3
[BOARD(SLOT4)]	Fast Ethernet board mounted in the optional slot 4

1.3.3 Screen Layout

In this manual, each screen has described mainly the example of the screen of Series 30*i*/31*i*/32*i*-A.
The basic content is the same though a detailed layout might be different from that of the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F.

2 DATA SERVER FUNCTIONS

The Data Server functions use a memory card built into a board for storing files and can transfer files and perform DNC operation using FTP.
A Data Server can operate on both FTP client and FTP server.
When you use a CNC to transfer files, the Data Server operates as an FTP client and communicates with the FTP server on the host computer.
When you use the host computer to transfer files, the Data Server operates as an FTP server and communicates with the FTP client on the host computer.

⚠ WARNING

1 To input or output data, the use of the ISO code input/output function is recommended.
Parity information is not contained with data input/output using the ASCII code. So, the use of the ASCII code is dangerous since any data corrupted during input/output operation with the CNC is not detected.
During DNC operation using a Data Server, data input using the ASCII code is also dangerous since parity information is not contained and any corrupted data in a read program is not detected.
If data corruption occurs, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For details of the ISO code input/output function, see Section 2.8, "ISO CODE INPUT/OUTPUT FUNCTION".
With the Series 30*i*/31*i*/32*i*-A, the ISO code input/output function cannot be used.

2 The memory card used for a Data Server can be deteriorated by writing data too many times. If a deteriorated memory card is used, the operation performance may be affected because it takes time to read data, or the machine may behave unexpectedly because correct data cannot be read, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For this reason, avoid operation involved with frequent rewriting.

3 The Program Transfer Tool is available as a PC tool for transferring NC programs between the CNC and personal computer. (drawing number: A08B-9510-J515) This tool allows NC programs to be transferred between a personal computer and CNC memory or Data Server memory card through a simple operation on the personal computer side. The transfer of NC programs between a personal computer and CNC memory requires the FOCAS2/Ethernet functions, and that between a PC and Data Server memory card requires the Data Server functions.

NOTE

1 Before communicating with the host computer using the Data Server functions, completely confirm that there is no problem with the entire system including communication with the personal computer because the personal computer environment may affect communication operation.

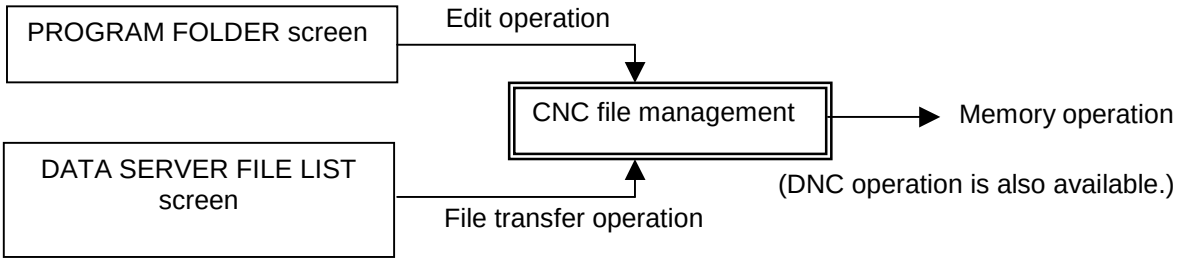
2 When the host computer operates as an FTP server, FTP server software must be run on the host computer. When the host computer operates as an FTP client, FTP client software must be run on the host computer.

2.1 DATA SERVER FILE MANAGEMENT

With the Data Server functions, you can format the built-in memory card in the CNC file management mode to manage NC programs.

CNC file management

For NC programs managed in the CNC file management mode, memory operation such as custom macro commands and M98-based subprogram calling are available. Operate the NC programs using the PROGRAM FOLDER screen in the same way as for NC programs in the CNC memory.
As a CNC external input/output device, DNC operation and M198-based subprogram calling are available. In this case, operate NC programs using the DATA SERVER FILE LIST screen.



NOTE
1 The Data Server for the Series 30*i*/31*i*/32*i*-A/B and Series 0*i*-F allows editing and memory operation of NC programs stored on the memory card, so the method of managing files on the memory card differs from the file management method of Data Servers for the Series 16*i*-B and so on. Note that, therefore, the memory card of the 30i-A is not compatible with the memory cards of Data Servers for the Series 16*i*-B and so on.
2 For operation and details of the PROGRAM FOLDER screen, refer to Chapter, "PROGRAM MANAGEMENT" in the "OPERATOR'S MANUAL" of the relevant CNC.
3 For operation and details of the DATA SERVER FILE LIST screen, refer to Chapter 1, "OPERATING THE DATA SERVER FUNCTIONS," in Part IV, "OPERATION."

2.1.1 File Names of CNC File Management

You can assign a file name and folder name to a file managed in the CNC file management mode in the same way as for CNC memory.

- Up to 32 characters
- Alphabetic characters (in upper and lower cases), numeric characters, and four symbols (+, -, _, and .)

NOTE
1 File names are case-sensitive.
2 Any file name or folder name cannot begin with a period (.).
3 It is impossible to assign the same name to a file and a folder.
4 Up to six levels of folders can be created.

File names and program numbers

When a file name assigned to a file consists of uppercase O and a numeric value, the file name is treated as a program number.
Values ranging from 1 to 9999 can be used (values ranging from 1 to 99999999 can be used according to the parameter setting).
A value beyond this range cannot be used for a file name in the program number format.

Example)
File names that can be used as program numbers
“O0123” Program number 123
“O0001” Program number 1
“O3000” Program number 3000
“O9999” Program number 9999
File names that cannot be used as program numbers
“ABC” (Does not have the format "O plus a numeric value")
“o123” (Does not begin with uppercase letter "O")
“O123.4” (Uses a character other than numeric characters)

NOTE
When files on a Data Server are managed by program number, their program numbers always consist of "O" plus a 4-digit number ("O" plus a 8-digit number). So, even if there are files managed with different file names such as "O1" and "O01" on a personal computer, their program numbers are regarded as the same when these files are transferred to the Data Server.

2.1.2 Number of Files Which Can Be Registered on a Data Server

In the initial status, the maximum number of files which can be registered on a memory card on a Data Server is 2047 and the maximum file size is 512 MB. Each folder is counted as one file.
The maximum number of files and the maximum file size can be changed using parameter No. 930.
For details, see Section 2.2, "RELATED NC PARAMETERS," in Part III, "SETTING."

2.1.3 Text Files and Binary Files

You can store the following two types of files on a memory card on a Data Server: text files and binary files.
Whether a program on a Data Server is a text or binary file can be checked by pressing soft key [DETAIL ON] in the DATA SERVER FILE LIST screen. When a program is a binary file, "R/B" is displayed.
For a text file, memory operation and edit operation as well as DNC operation can be performed by selecting it as a main program.
For binary files, only DNC operation is available, but programs for high-speed binary operation can be handled.

The following table lists differences between text files and binary files.

Attribute of file	Operation					Editing
	Selected as a main program	Memory operation	DNC operation	Subprogram calling		
				M98	M198	
Text file	Available	Available	Available	Available	Available	Available
Binary file	Unavailable	Unavailable		Unavailable		Unavailable

Follow the procedures below to specify a text or binary file:

(1) When registering a file from the CNC
In the DATA SERVER HOST FILE LIST screen, to register a file as a text file, use [GET], or to register it as a text file, use [BGET].

(2) When registering a file from the host computer
A parameter is available to set whether to register a file as a text or binary file. For details, see Section 2.2, "RELATED NC PARAMETERS" in Part III, "SETTING".

If NC data other than an NC program is not handled as a binary file, it may not be able to be input or output correctly. NC data output and stored on a memory card on a Data Server from the CNC is automatically handled as a binary file. A file to be transferred from a personal computer to a memory card on a Data Server must be specified explicitly as a binary file.

NOTE

1 An NC program stored as a text file is converted to an editable file format so that the file can be edited on the CNC. For this reason, when a text file is read from the host computer to the memory card on the Data Server, then the file is transferred to the host computer, binary compatibility can no longer be maintained.

2 The file name of a text file and the O number or arbitrary file name in the program are always the same. See Section 2.5, “NC PROGRAM FORMAT” for details

2.2 DATA SERVER MODES

Each Data Server mode determines the input or output destination when a Data Server is operated as a CNC external input/output device. You can select one of the following three modes.

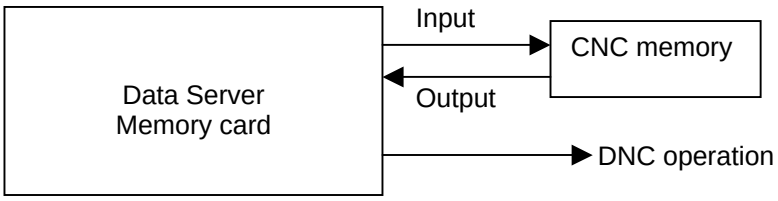
NOTE

1 Data Server modes are valid only when the Data Server is operated as an external storage device of the CNC. In case of main program operation for editing and a memory operation and an M98-based subprogram call, programs on the memory card of the Data Server are selected regardless of the Data Server mode.

2 When a file is input to or output from the Data Server board with the FTP server function by operating an FTP client on the host computer, there is no difference in operation among Data Server modes.

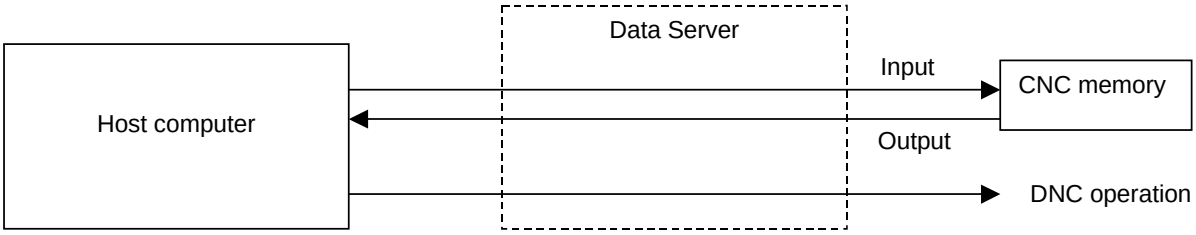
Storage mode

The memory card built into the Data Server is selected as the external input/output device.
For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the memory card built into the Data Server.
When input operation is executed for the Data Server, the relevant NC program is read from the memory card built into the Data Server.
Conversely, when NC program output operation is executed for the Data Server, the output NC program is written on the memory card built into the Data Server.



FTP mode

The host computer connected to the Data Server is selected as the external input/output device.
For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the host computer.
When input operation is executed for the Data Server, the relevant NC program is read from the host computer connected to the Data Server.
Conversely, when NC program output operation is executed for the Data Server, the output NC program is directly written on the host computer.



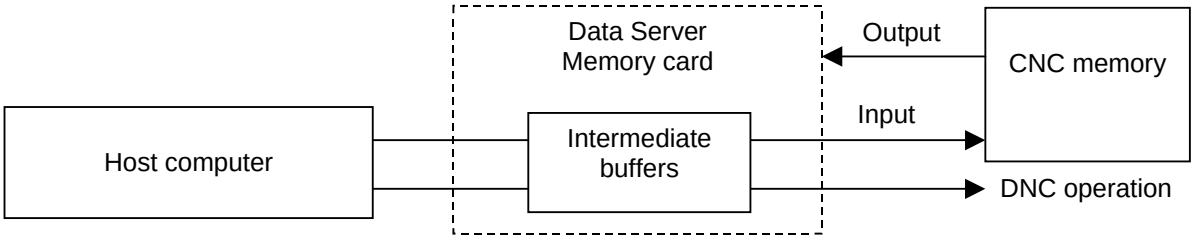
⚠ CAUTION

1 In the FTP mode, an NC program is transferred from the host computer to the CNC. For this reason, if the line is disconnected during communication for some reason such as noise on the network, the disconnection directly affects the CNC operation as compared with the storage mode. Before DNC operation in the FTP mode, surely take measures to prevent noise and make sure that good communication conditions are present.

2 When feed hold is performed during DNC operation in the FTP mode, communication with the host computer may be stopped. In this case, the host computer may disconnect the communication. Perform feed hold during a trial run and completely confirm that the communication with the host computer is not disconnected.
This symptom is generally caused because the CNC data read speed is slow and the host computer causes a timeout. Depending on the machining program, the host computer may cause a timeout even when communication is not stopped by feed hold. If this symptom occurs, use DNC operation in the FTP mode while being careful not to cause a timeout, or use DNC operation in the storage mode, and not in the FTP mode.

Buffer mode

The host computer connected to the Data Server is selected as the external input device.
In the buffer mode unlike the FTP mode, however, areas on the memory card built into the Data Server are used as intermediate buffers. For details of the buffer mode, see Section 2.3, "DETAILS OF THE BUFFER MODE," which is the following section.
As the external output device, the memory card built into the Data Server is selected. When NC program output operation is performed, the operation equivalent to that in the storage mode is performed.



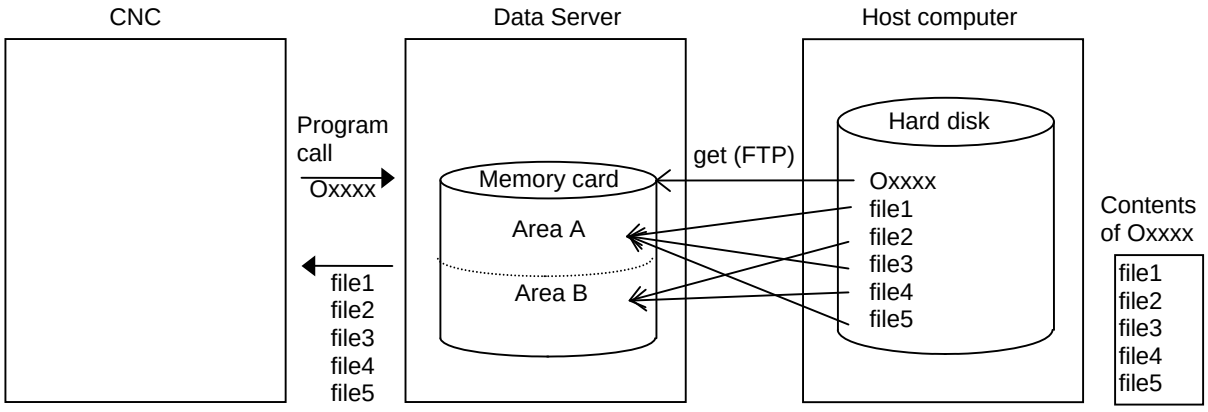
NOTE
1 With the Series 30*i*/31*i*-A, to use the buffer mode, the buffer mode function option (J728) is required.
2 With the Series 32*i*-A, the buffer mode cannot be used.

2.3 DETAILS OF THE BUFFER MODE

In the buffer mode, two areas (areas A and B) are prepared on the memory card. While the NC program data stored in one area is being supplied to the CNC, the subsequent NC program data is read in the other area from the host computer using FTP transfer. When all data in the former area has been supplied to the CNC, the data in the latter area is supplied to the CNC. In the former area, which becomes empty, the subsequent NC program data is read from the host computer using FTP transfer.
Repeating this operation enables an NC program larger than the capacity of the memory card to be handled. To use the buffer mode, however, the original NC program must be divided into some files on the host computer in advance.
The size of a divided file must be smaller than half the remaining capacity of the memory card. If the size of a divided file is too large (for example, 100 MB or more), it takes much time to read the first file from the host computer and it also takes time until operation starts.

Using the buffer mode

In the buffer mode, a file (such as Oxxxx) called by DNC operation or M198-based subprogram calling is a file list. The file list contains the names of files to be called in the order in which they are to be called. In the buffer mode, the Data Server sequentially calls the files specified in the file list from the host computer and supplies data to the CNC.



Files (file1 to file5) specified in the file list on the host computer are stored on the memory card built into the Data Server using FTP transfer and supplied to the CNC. In the buffer mode, after the CNC issues a request to read an NC program to the Data Server, the specified file list is read from the host computer. When the first file has been read, the Data Server starts supplying data to the CNC. For this reason, it takes time from when the CNC issues a request to read a program to when the Data Server starts supplying data.
While the Data Server is supplying the data in one area to the CNC, it stores data into the other area using FTP transfer. For this reason, divide the original program data so that two consecutive files can be contained on the memory card built into the Data Server.
Although the data in one area has been supplied to the CNC, FTP transfer may not terminate for the other area. In this case, program calling terminates abnormally because the subsequent data cannot be supplied. You can use a parameter not to cause the abnormal termination.
In the file list, you can specify any file name allowed by the host computer that consists of up to 255 single-byte alphanumeric characters. Be sure to specify at least one LF (0A in hexadecimal) or CR (0D in hexadecimal) following each file name in the file list to delimit the file names.

NOTE

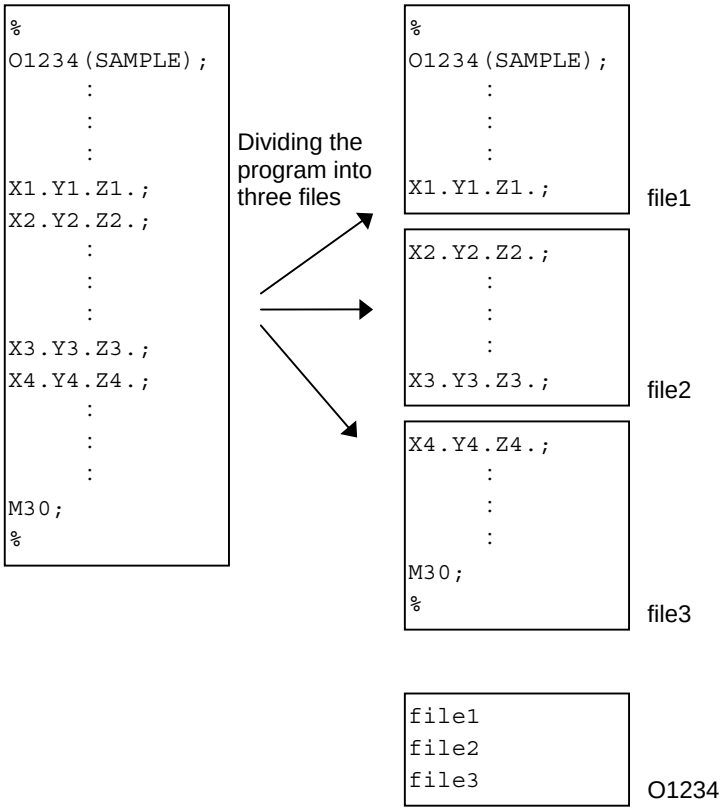
In the buffer mode, you can also register a new file on the memory card built into the Data Server by the "NC program GET" or "NC program output" operation.
By this operation, however, the remaining capacity of the memory card built into the Data Server that is required for operation in the buffer mode may be exhausted, resulting in an error in DNC operation in the buffer mode.
For this reason, during DNC operation in the buffer mode, do not register any new file on the memory card built into the Data Server.

Dividing an NC program into files

To perform operation in the buffer mode, divide an original NC program into several files on the host computer and create a file list indicating the order in which the divided files are to be transferred in advance.

Example)

Dividing an NC program into three files



As shown above, divide an original NC file into three files, file1, file2, and file3. Specify the divided file names in the file list (file name: O1234).

⚠ CAUTION

In the above example, the NC program is divided into files so that any block is not divided. You can divide a program at a point in a block. When dividing a program at a point in a block, be careful so that any unnecessary character is not inserted at the end of each file.

If an unnecessary character is inserted at the end of a file, the NC program may perform unexpected operation when executed. Be very careful when preparing and editing an NC program on the host computer.

NOTE

1 Divide an NC program into files so that each file size is about 20 to 30 MB. If the file size is too large, it takes time until DNC operation starts. If the file size is too small, data transmission may stop between files and operation may stop.

2 Although you can divide an NC program at a point in a block, divide the program in block units whenever possible and retract the tool at the end of each divided file. This prevents data transmission from stopping at the end of a file and cutter marking from being made.

3 Store the file list and relevant divided files in the same folder (directory) on the same host computer.

2.4 OPERATION FROM A DATA SERVER

NOTE
The Data Server functions produce an effect when large NC programs are operated. Use the Data Server Functions to handle large NC programs.

Memory operation

You can perform memory operation for an NC program on the memory card built into a Data Server in the same way as for an NC program in the CNC memory.
You can also supply an NC program simultaneously for a multipath CNC system.

NOTE
When memory operation is performed, a selected NC program on the Data Server must be a text file. It is impossible to use a binary file for memory operation.

M198 subprogram operation

In the storage mode, you can perform M198 calling from the memory card built into a Data Server. In the FTP or buffer mode, you can perform M198 calling form the host computer.
On the DATA SERVER FILE LIST screen, set an M198 folder in advance. When M198 calling is specified, the set M198 folder is searched for the target subprogram.

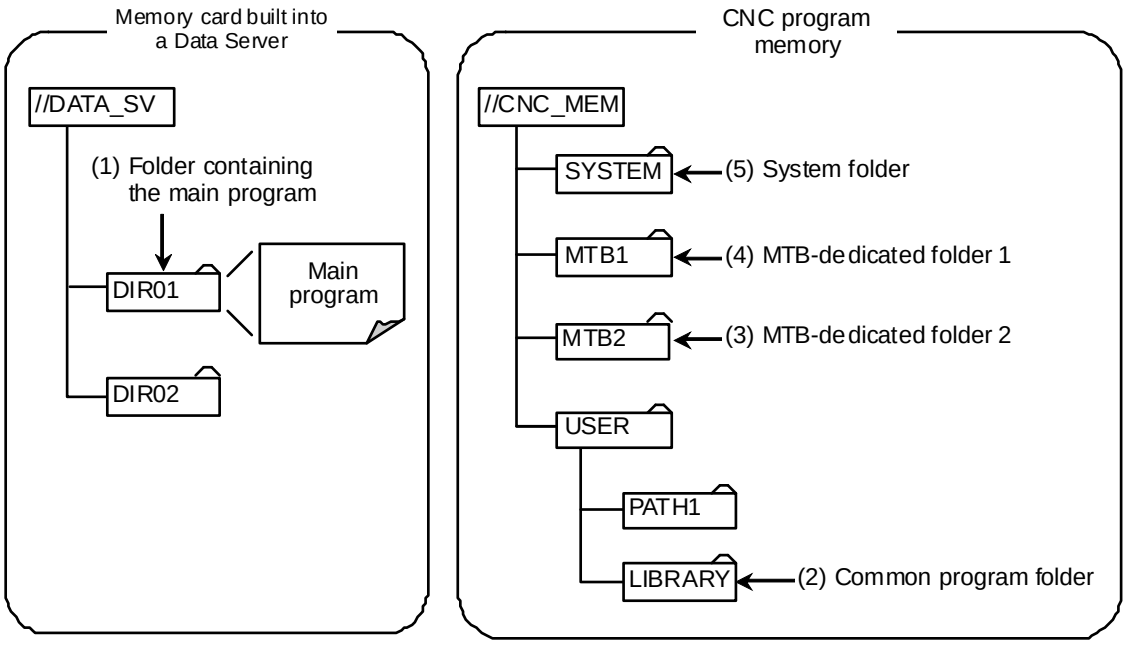
DNC operation

In the storage mode, you can perform DNC operation from the memory card built into a Data Server. In the FTP or buffer mode, you can perform DNC operation from the host computer.
On the DATA SERVER FILE LIST screen, set the file name for DNC operation in advance. When DNC operation starts, the set DNC operation file is called.

2.4.1 Subprogram Search during Memory Operation

The subprogram search sequence during memory operation for an NC program on the memory card built into a Data Server is the same during memory operation for an NC program in the CNC program memory.

Order in which a subprogram is called from the main program on a Data Server (1) to (5)



NOTE

1. You can set whether to enable search (2) to (5) in the figure above with parameter No. 3457. For details, see “Parameter Manual” of the relevant CNC.
2. On the memory card built into a Data Server, only the subprograms in the folder containing the main program can be executed.
3. It takes time to call a program on the memory card built into a Data Server as a subprogram as compared with the CNC memory. Be careful when calling many small programs.

2.5 NC PROGRAM FORMAT

NC programs prepared on the host computer must have the following format:

```
% TITLE ;
O0001(COMMENT) ;
        .
        .
        .
M30 ;
%
```

An NC program starts with a start file mark (%). In the subsequent part (leader section) until EOB (;, program start) is encountered, a comment such as a title can be inserted as necessary.

At the beginning of the program section, be sure to specify an O number or arbitrary file name consisting of up to 32 characters that is enclosed with “<” and “>” as the program name. This O number or file name must be used for management on the personal computer.
If the O number or arbitrary file name in an NC program and the file name in the personal computer are not the same, the file name in the personal computer is used basically when the program is transferred from the personal computer to the Data Server (NOTE 2).
The semicolon ";" used at the end of each block means EOB (end of block) and actually functions as LF (LF: 0A in hexadecimal), CR-LF (CR: 0D in hexadecimal), or LF-CR-CR.
The NC program must end with "M code ; %".
When performing binary input operation, insert data for binary input operation, enclosed with the start code and end code of binary input operation, into the part ". . ." in the above figure.
For details of the NC program configuration and binary input operation, refer to the relevant CNC OPERATOR’S MANUAL.

⚠ WARNING

If an NC program prepared on the host computer does not use the program format specified by the CNC, executing the NC program can cause an unpredictable operation. So, special care should be taken when an NC program is prepared on the host computer.

NOTE

1 Any unrecognizable character codes in an NC program registered as a text file on a memory card on a Data Server are ignored. Do not use any unrecognizable character code.
A 2-byte code used for Japanese and others may be recognized as an invalid character code when the system recognizes it on a byte-by-byte basis. Do not use any 2-byte code used for Japanese and others.

2 The system always manages each text file on the memory card so that the file name and the O number or arbitrary file name in the program are the same. For this reason, if they are different, the system sets the O number or arbitrary file name to the file name when transferring the file. The O number or arbitrary file name in the program can also be set as the file name when the file is transferred according to the parameter setting, however.

2.6 LIST FILE FORMAT

In the LIST-GET, LIST-PUT, and LIST-DELETE functions described later, one of the following list file formats must be used:

Format 1

```
% ;
O0001(COMMENT) ;
N111 ;
N222 ;
N333 ;
   :
   :
N999 ;
%
```

Format 3

```
% ;
O0001(COMMENT) ;
(Dtsvr-File) ;
(Dtsvr-File) ;
(Dtsvr-File) ;
   :
   :
(Dtsvr-File) ;
%
```

Format 2

```
% ;
O0001(COMMENT) ;
N111 (PC-File) ;
N222 (PC-File) ;
N333 (PC-File) ;
   :
   :
N999 (PC-File) ;
%
```

Format 4

```
% ;
O0001(COMMENT) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ;
   :
   :
(Dtsvr-File, PC-File) ;
%
```

Specifications common to all formats

<1> A list file begins with a start file mark "%".
<2> In the next block, be sure to specify an O number. Assign this O number as the file name.
A comment enclosed in parentheses "(" and ")" can be inserted between the O number and EOB.
<3> In the subsequent blocks, specify files to be processed.
<4> The list file must end with "%".

Specifications of format 1

The following describes the specifications of list file format 1:

<1> This specification method applies when the file names of files to be processed have the format "Oxxxx" (where "xxxx" denotes a 4-digit number). In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.
<2> The LIST-GET service transfers "Oxxxx" files stored on the built-in hard disk of the host computer to the built-in memory card of the Fast Data Server without modifying file names "Oxxxx". The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the Fast Data Server to the built-in hard disk of the host computer without modifying file names "Oxxxx". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the Fast Data Server.

Specifications of format 2

The following describes the specifications of list file format 2:

<1> This specification method applies when files to be processed are named "Oxxxx" (where "xxxx" denotes a 4-digit number) on the built-in memory card of the Fast Data Server and are named arbitrary file names on the built-in hard disk of the host computer. In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name on the Fast Data Server. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.
A file name on the built-in hard disk of the host computer can be specified by enclosing it with parentheses "(" and ")" following the corresponding "Nxxxx". The characters that can be used in file names depend on the OS of the host computer.

<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the Fast Data Server as "Oxxxx" files. The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the Fast Data Server to the built-in hard disk of the host computer as files with arbitrary file names "PC-File". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the Fast Data Server.

Specifications of format 3

The following describes the specifications of list file format 3:

<1> This specification method applies when the file names of files to be processed are arbitrary file names. In this case, file names on the built-in memory card of the Fast Data Server and on the built-in hard disk of the host computer are assumed to be the same. Specify an arbitrary file name enclosed with parentheses "(" and ")". The characters that can be used in arbitrary file names are the following 66 ASCII characters only:
Numeric characters 0 to 9
Lowercase letters a to z
Uppercase letters A to Z
Four symbols (+, -, _, .)

<2> The LIST-GET service transfers files with arbitrary file names "Dtsvr-File" stored on the built-in hard disk of the host computer to the built-in memory card of the Fast Data Server with the file names kept unchanged.
The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the Fast Data Server to the built-in hard disk of the host computer with the file names "Dtsvr-File" kept unchanged. The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the Fast Data Server.

Specifications of format 4

The following describes the specifications of list file format 4:

<1> This specification method applies when files to be processed have arbitrary file names. In this case, file names on the built-in memory card of the Fast Data Server and file names on the built-in hard disk of the host computer are assumed to be different. Specify a file name on the built-in memory card of the Fast Data Server and a file name on the built-in hard disk of the host computer in parentheses, separated by a comma ",".
The characters that can be used in file names on the built-in memory card of the Fast Data Server are the following 66 ASCII characters only:
Numeric characters 0 to 9
Lowercase letters a to z
Uppercase letters A to Z
Four symbols (+, -, _, .)
The characters that can be used in arbitrary file names on the built-in hard disk of the host computer depend on the OS of the host computer.

<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the Fast Data Server as "Dtsvr-File" files.

The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the Fast Data Server to files with file name "PC-File" on the built-in hard disk of the host computer.
The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the Fast Data Server.

Limitations on file names in a list file

The following limitations apply when file names are specified in a list file:

<1> The characters that can be used in file names on the built-in memory card of the Fast Data Server are the following 66 ASCII characters only:
Numeric characters 0 to 9
Lowercase letters a to z
Uppercase letters A to Z
Four symbols (+, -, _, .)
The characters that can be used in arbitrary file names on the built-in hard disk of the host computer depend on the OS of the host computer.

<2> Up to 255 characters can be used as an arbitrary file name on the built-in hard disk of the host computer. However, the number of characters that can actually be used depends on the OS of the host computer.

Storage locations of list files

The LIST-GET, LIST-PUT, and LIST-DELETE services are useful functions for managing NC programs in groups.
The places where list files are prepared vary depending on the service to be executed.
For the LIST-GET service, NC programs to be operated on are present on the built-in hard disk of the host computer, so list files are placed also on the built-in hard disk of the host computer.
For the LIST-PUT and LIST-DELETE services, NC programs to be operated on are present on the built-in memory card of the Fast Data Server, so list files are also prepared on the built-in memory card of the Fast Data Server.

2.7 DATASERVER Explorer CONNECTION

The following functions are added to FTP Server function of Data Server.

- Increase of FTP Server connections.
  The number of FTP server connections can be increased from five to ten by this feature.
- Connection with Windows Explorer.
  When you use the Windows Explorer as an FTP client software, you can make a new folder and overwrite a file.
  For the FTP client operation using the Explorer, see APPENDIX D.2, "OPERATION USING THE Explorer."
- Addition of maintenance screen for FTP server.
  You can monitor the state of FTP server. And you can disconnect the connection of FTP client forcedly.
  For the operation of the maintenance screen, see Section 2.5, "FTP SERVER MAINTENANCE" in Part VI, "MAINTENANCE."

NOTE

1 To use the DataServer Explorer connection, the DataServer Explorer connection option (R953) is required.
2 Some FTP client software programs may each internally use two or more FTP clients. Note, therefore, that the number of FTP clients is not always equal to the number of applications.

2.8 ISO CODE INPUT/OUTPUT FUNCTION

Use this function to input and output NC data between the CNC and Data Server and between the personal computer and Data Server using the ISO code. Parity information is added to the ISO code unlike the conventional ASCII code. This function checks this parity information, which improves the reliability of data input/output.
While the most significant bit of the ASCII code is OFF, the most significant bit of the ISO code is used as parity information so that the number of ON bits per character is even.

NOTE
1 NC data may not be able to be transferred correctly between the personal computer and Data Server, depending on the FTP communication software on the personal computer used.
2 If an ISO code parity error is detected in a comment part, no error is caused and the relevant character is converted to a blank character.
3 When the ASCII code is selected as the input/output code, parity information is not checked. The parity information in the most significant bit is removed and the data is transferred as the ASCII code even if ISO code data is transferred.
4 To input and output data between the CNC and Data Server, a Data Server must be selected as an I/O device. For details of the selection of an I/O device and input/output code, see Section 2.2, "RELATED NC PARAMETERS" in Part III, "SETTING".
5 Prepare NC data using the ISO code on the personal computer regardless of which Data Server mode is selected.
For details of Data Server modes, see Section 2.2, "DATA SERVER MODES".
A tool (FANUC ISO Converter) is available for creating and checking NC data using the ISO code on the personal computer. For details of this tool, refer to Appendix in "OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)" of the relevant CNC.
6 With the Series 30i/31i/32i-A, the ISO code input/output function cannot be used.

Input from a Data Server to the CNC

When the ISO code is selected as the input/output code and the CNC receives data from a Data Server, the ISO code input/output function checks the ISO code for data validity.
If the function detects any character with wrong parity information, it terminates abnormally.

Target functions
(1) Program input
(2) M198-based subprogram call
(3) DNC operation

NOTE
1 On the CNC, the function checks the ISO code of received data regardless of whether the file from the Data Server is a text or binary file.
For details of text and binary files, see Subsection 2.1.3, "Text Files and Binary Files".
2 On the CNC, the function checks the ISO code of received data regardless of which Data Server mode is selected.
For details of Data Server modes, see Section 2.2, "DATA SERVER MODES".

Output from the CNC to a Data Server

When the ISO code is selected as the input/output code, the ISO code input/output function checks the ISO code for data validity before data is stored on the memory card on the Data Server.
If the function detects any character with wrong parity information, it terminates abnormally.

Target functions
(1) Program output

NOTE
1 When the Data Server is in the FTP mode, data is output directly to the personal computer, and the ISO code input/output function does not check the ISO code on the Data Server. In this case, check the data on the personal computer separately.
2 When multiple NC programs are output at a time or NC parameters are output, they are output as binary files to the Data Server.
The ISO code input/output function does not check the ISO code in binary files on the Data Server.

File transfer from the personal computer to the Data Server

When the ISO code is selected as the input/output code, the ISO code input/output function checks the ISO code for data validity before data received from the personal computer is stored on the memory card on the Data Server.
If the function detects any character with wrong parity information, it terminates abnormally.

Target functions
(1) GET (The Data Server operates as an FTP client.)
(2) PUT (The Data Server operates as an FTP server.)

NOTE
1 Prepare NC data using the ISO code on the personal computer.
2 When a binary file is transferred, the ISO code input/output function does not check the ISO code before the file is stored on the memory card on the Data Server.
3 During FTP transfer between the personal computer and Data Server, data validity is checked as the FTP transfer protocol function.
The ISO code check can be enabled to check data redundantly.

File transfer from the Data Server to the personal computer

When the ISO code is selected as the input/output code, data is output using the ISO code from the memory card on the Data Server.

Target functions
(1) PUT (The Data Server operates as an FTP client.)
(2) GET (The Data Server operates as an FTP server.)

NOTE

1 Check the ISO code on the personal computer as required.
2 When a binary file is transferred, it is not converted to the ISO code on the Data Server.
3 During FTP transfer between the personal computer and Data Server, data validity is checked as the FTP transfer protocol function.
The ISO code check can be enabled to check data redundantly.

3 FOCAS2/Ethernet FUNCTIONS

The FOCAS2/Ethernet functions can remotely control and monitor the CNC by using a personal computer. For details, refer to the manual delivered with the FOCAS2 library software.

NOTE

1 In the FOCAS2/Ethernet functions, the CNC operates as a server and waits for a communication start request from a personal computer that operates as a client. As communication with the personal computer starts, two sockets are used for control and monitoring from the personal computer and for file transfer.

2 For the FOCAS2/Ethernet functions, the machine tool builder or end user can create desired software operated on each personal computer using the FOCAS2 library software.
Communication timing and other factors may vary depending on the personal computer environment. Before starting communication, completely confirm that there is no problem with the entire system including communication with the personal computer.

3 The Program Transfer Tool is available as a PC tool for transferring NC programs between the CNC and personal computer. (drawing number: A08B-9510-J515) This tool allows NC programs to be transferred between a personal computer and CNC memory or Data Server memory card through a simple operation on the personal computer side. The transfer of NC programs between a personal computer and CNC memory requires the FOCAS2/Ethernet functions, and that between a PC and Data Server memory card requires the Data Server functions.

4 DNS/DHCP CLIENT FUNCTIONS

If DNS/DHCP is used for communication setting of the Data Server functions and FOCAS2/Ethernet functions, Ethernet addresses (IP address and subnet mask) can be set at a time on the host computer to facilitate Ethernet address control.

DNS

With the DNS function, a fully qualified domain name (e.g., www.fanuc.co.jp) can be specified instead of a hard-to-remember IP address just consisting of numbers (e.g., 192.168.0.10) when a TCP/IP communication destination is to be specified.

NOTE

To use the DNS function, a personal computer having the DNS server function is additionally required. See Chapter 4, "SETTING THE DNS/DHCP FUNCTION," in Part III, "SETTING," and APPENDIX C, "EXAMPLE OF SETTING UP DNS/DHCP."

DHCP

With the DHCP function, Ethernet addresses (IP address and subnet mask) that need to be set on the CNC can be set on the host computer.

NOTE

To use the DHCP function, a personal computer having the DHCP server function is additionally required. See Chapter 4, "SETTING THE DNS/DHCP FUNCTION," in Part III, "SETTING," and Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

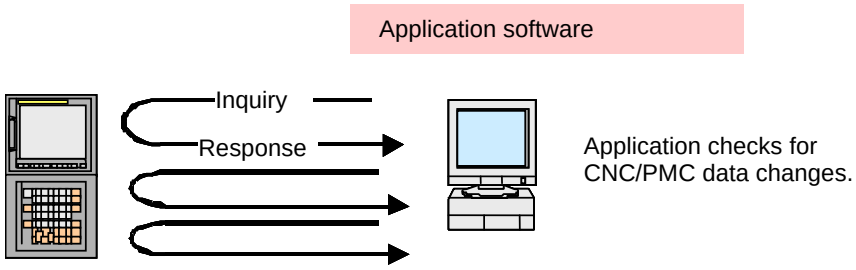
5 MACHINE REMOTE DIAGNOSIS FUNCTIONS

With the machine remote diagnosis functions, checking of the internal CNC status, ladder program editing, and other operations can be performed as necessary by using a personal computer through a LAN.
For details, refer to “Machine Remote Diagnosis Package OPERATOR’S MANUAL (B-63734EN).”

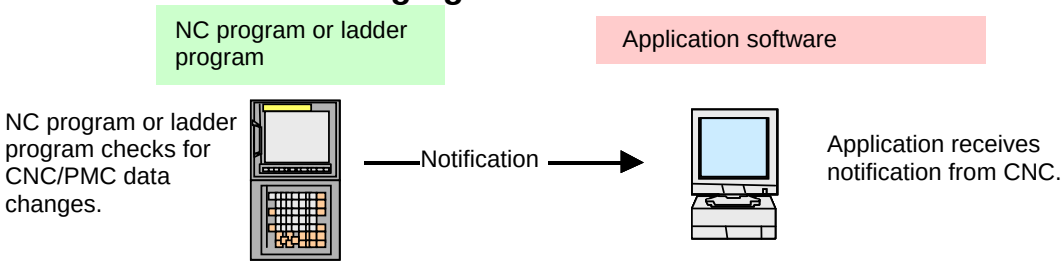
6 UNSOLICITED MESSAGING FUNCTION

With the unsolicited messaging function, the CNC transmits messages (CNC/PMC data) in an unsolicited manner to application software on the personal computer according to a command from an NC program or ladder program. By using this function, the need for application processing on the personal computer to periodically inquire about the state of the CNC can be eliminated.

When the conventional function is used



When the unsolicited messaging function is used



NOTE
The unsolicited messaging function is a part of the FOCAS2/Ethernet function.

Unsolicited messaging function execution procedure

The execution procedure for the unsolicited messaging function is described below.

1 Preparation on the personal computer
Create an application using the FOCAS2 function for the unsolicited messaging function and install the unsolicited message server on a personal computer. For the method of creating an application using the FOCAS2 function for the unsolicited messaging function and the method of installing the unsolicited message server, refer to Chapter, "UNSOLICITED MESSAGING FUNCTION", in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data Window Library Operator's Manual".

2 Preparation on the CNC
Create an NC program or ladder program for controlling unsolicited messaging.
For the method of creating an NC program or ladder program, see Section 6.2, "EXECUTING THE UNSOLICITED MESSAGING FUNCTION" in Part III, “OPERATION.”

3 Setting of the communication parameters for the unsolicited messaging function
To use the unsolicited messaging function, the following communication parameter settings are needed:
(1) Setting for using the FOCAS2/Ethernet function
(2) Setting of the parameters for the unsolicited messaging function

For (2), a choice can be made from two modes of setting: CNC mode for setting on the CNC screen and the PC mode for setting on the personal computer.
For the setting method of (1) and (2), see Section 6.1, "SETTING OF THE UNSOLICITED MESSAGING FUNCTION" in Part III, "OPERATION."

4 Starting the NC program or ladder program
Start the NC program or ladder program created in step 2, "Preparation on the CNC". At this time, no unsolicited message is transmitted to the personal computer until step 5, "Starting the unsolicited messaging function", is executed.

5 Starting the unsolicited messaging function
Execute the FOCAS2 function cnc_unsolicstart on the personal computer. This execution places the CNC in the state (named "Ready") where a transmission request from the NC program or ladder program is awaited. Each time a transmission request is made from the NC program or ladder program, an unsolicited message is automatically transmitted to the personal computer.

6 Ending the unsolicited messaging function
To end unsolicited message transmission, execute the FOCAS2 function cnc_unsolicstop on the personal computer. This execution places the CNC in the state (named "Not Ready") where no unsolicited message is transmitted even when a request for transmission is made from the NC program or ladder program.

7 FTP FILE TRANSFER FUNCTION

The FTP file transfer function is operated from the CNC to transfer a file. It works as an FTP client and communicates with the FTP server on the host computer.

⚠ WARNING

To input or output data, the use of the ISO code input/output function is recommended.
Parity information is not contained with data input/output using the ASCII code. So, the use of the ASCII code is dangerous since any data corrupted during input/output operation with the CNC is not detected.
If data corruption occurs, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For details of the ISO code input/output function, see Section 2.8, "ISO CODE INPUT/OUTPUT FUNCTION".
With the Series 30*i*/31*i*/32*i*-A, the ISO code input/output function cannot be used.

NOTE

1 Before communicating with the host computer using the FTP file transfer function, completely confirm that there is no problem with the entire system including communication with the personal computer because the personal computer environment may affect communication operation.
2 To operate the host computer as the FTP server, FTP server software must be operated on the host computer.

III. SETTING

1 SETTING THE COMMUNICATION FUNCTION

This part describes the settings required to operate the following Fast Ethernet/Fast Data Server functions:

- Data Server functions
- FOCAS2/Ethernet functions
- DNS/DHCP functions
- Machine remote diagnosis functions
- Unsolicited messaging function
- FTP file transfer function

Notes on using the functions for the first time

⚠ CAUTION

When setting the Fast Ethernet/Fast Data Server for the first time, carefully set data such as an IP address and conduct a sufficient communication test, consulting with your network administrator.
If data such as an IP address is not set correctly, a communication failure can affect the entire network. Take sufficient care.
The load on the network may become greater than expected depending on the performance of the personal computer. Before using the functions, completely confirm that there is no problem with the entire system including communication with the personal computer.

NOTE

When the 8-level data protection function is enabled, whether the communication parameters can be set depends on the Ethernet function setting for the 8-level data protection function.
In the Series 30*i*/31*i*/32*i*-A, the communication parameters are not processed by the 8-level data protection function.

1.1 BACKING UP/RESTORING COMMUNICATION PARAMETERS

This section explains how to back up communication parameters for Fast Ethernet/Fast Data Server to the I/O device and to restore them from the I/O device.
As an I/O device, the memory card or USB memory is available. To select an I/O device, use parameter No. 20.

⚠ WARNING

When [RESTORE] is executed for communication parameters, the communication parameters including the allocation of a PMC area to each communication function are all restored. When [ALL RESTORE] is executed for communication parameters, the communication parameters valid for embedded Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are all restored. When the unsolicited messaging function is enabled, the allocation of macro variables is also restored.
For this reason, immediately after executing [RESTORE] or [ALL RESTORE] for communication parameters, fully understand instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual and carefully check the setting of the communication parameters of the relevant communication functions before starting operation.
For any communication function for which any PMC area or macro variable is allocated, make sure that DI/DO data, status data (data for monitoring the communication status), and macro variable operate correctly before starting operation.
If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ CAUTION

While an external I/O device such as the memory card or USB memory is being accessed, do not turn the power to the CNC off or remove the external I/O device. Doing so may damage the external I/O device.

NOTE

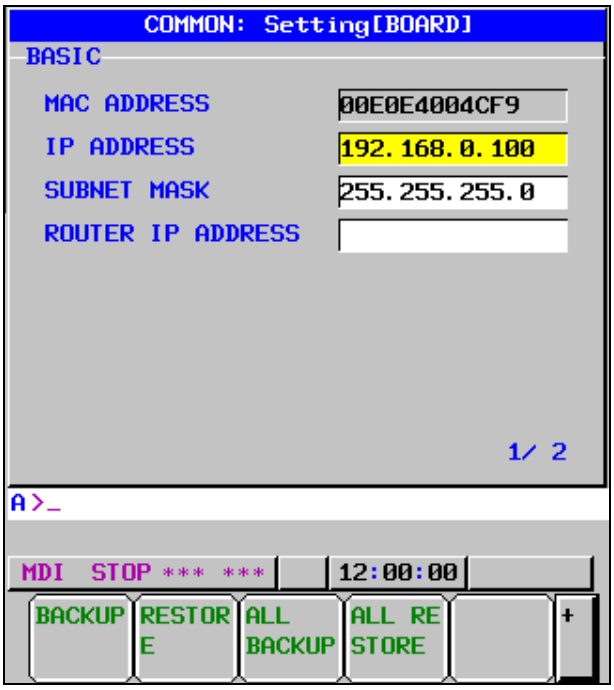
1 Communication parameters can be backed up or restored only in the MDI mode, EDIT mode, or emergency stop state.
2 When the 8-level data protection function is enabled, whether the communication parameters can be backed up or restored depends on the Ethernet function setting for the 8-level data protection function.
3 Communication parameters can be backed up or restored only using the memory card or USB memory as the I/O device.
With the Series 30*i*/31*i*/32*i*-A, the USB memory cannot be used.

Procedure

1 Press the function key

.
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)
3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4 Press the soft keys [COMMON] - [(OPRT)] and then [+]. The soft keys [BACKUP], [RESTORE], [ALL BACKUP], and [ALL RESTORE] for backing up or restoring communication parameters appear.
5 Press the soft key [BACKUP], [RESTORE], [ALL BACKUP], or [ALL RESTORE]. The soft keys [EXECUTE] and [CANCEL] appear.

6 Enter the name of a file to be backed up or restored in the key-in buffer, and press the soft key [EXECUTE]. The operation selected at the above step is executed.
The character string “EXECUTING” blinks during execution.



Operation

BACKUP

The communication parameters for Fast Ethernet/Fast Data Server are saved from the SRAM of the CNC main unit to the I/O device.
If a file name is specified in the key-in buffer, the specified file name is used when the communication parameters are saved to the I/O device. If no file name is specified, the file name “ETHERBRD.MEM” is used.

RESTORE

The communication parameters for Fast Ethernet/Fast Data Server are read from the I/O device and saved to the SRAM of the CNC main unit.
If a file name is specified in the key-in buffer, the specified file name is used when the communication parameters are read from the I/O device. If no file name is specified, the file name “ETHERBRD.MEM” is used.

ALL BACKUP

All valid communication parameters for embedded Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are saved from the SRAM of the CNC main unit to the I/O device.
If a file name is specified in the key-in buffer, the specified file name is used when the communication parameters are saved to the I/O device. If no file name is specified, the file name “NETWORK.MEM” is used.

ALL RESTORE

All valid communication parameters for embedded Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are read from the I/O device and saved to the SRAM of the CNC main unit.
However, if a communication function related to a valid communication parameter is disabled in the CNC, that parameter is not saved to the SRAM.
If a file name is specified in the key-in buffer, the specified file name is used when the parameters are read from the I/O device. If no file name is specified, the file name “NETWORK.MEM” is used.

NOTE
When communication parameters are restored, an alarm condition occurs that requires power-off.

1.1.1 Related NC Parameters

0020	I/O CHANNEL: Input/output device selection, or interface number for a foreground input/output device

[Input type] Setting input
[Data type] Byte
[Valid data range] 4: Selects the memory card as the input/output device.
17: Selects the USB memory as the input/output device.
It is not possible to backup and restore the communication parameters by using other devices.

NOTE
In case of Series 30*i*/31*i*/32*i*-A, the memory card is used regardless for this NC parameter.

2 SETTING THE DATA SERVER FUNCTIONS

This chapter describes the communication setting for the Data Server functions.

Notes on using the Data Server functions

⚠ WARNING

1 To input or output data, the use of the ISO code input/output function is recommended.
Parity information is not contained with data input/output using the ASCII code. So, the use of the ASCII code is dangerous since any data corrupted during input/output operation with the CNC is not detected.
During DNC operation using a Data Server, data input using the ASCII code is also dangerous since parity information is not contained and any corrupted data in a read program is not detected.
If data corruption occurs, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For details of the ISO code input/output function, see Section 2.8, "ISO CODE INPUT/OUTPUT FUNCTION" in Part II, “SPECIFICATION”.
With the Series 30*i*/31*i*/32*i*-A, the ISO code input/output function cannot be used.

2 The memory card used for a Data Server can be deteriorated by writing data too many times. If a deteriorated memory card is used, the operation performance may be affected because it takes time to read data, or the machine may behave unexpectedly because correct data cannot be read, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For this reason, avoid operation involved with frequent rewriting.

⚠ CAUTION

1 Operation cannot be guaranteed for any memory card that is not recommended by FANUC.
Be sure to use a memory card recommended by FANUC.

2 When using the Fast Data Server for the first time, be sure to format the memory card, set parameters, then turn the power off then back on. If an attempt is made to use the Data Server functions without following these steps, normal operation is not guaranteed.

3 Before performing FTP communication using the Fast Data Server for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network.
Be very careful about any communication failure. If a Data Server is used on a network involved with a communication failure, a communication failure intermittently occurs in the Data Server, which may cause a CNC system error.

4 When the power to the CNC is turned off during access to the memory card, files stored on the memory card may be destroyed. So, be careful not to turn off the power to the CNC during access to the memory card.

5 In preparation for damage to the memory card, always take backup copies of the files stored on the memory card to the host computer.

NOTE

1 With the Data Server functions (FTP client), a single CNC can connect only one FTP server.
2 With the Data Server functions (FTP server), a single CNC can connect up to five FTP clients. However, some FTP client software programs may each internally use two or more FTP clients. Note, therefore, that the number of FTP clients is not always equal to the number of applications.
If the DataServer Explorer connection is enabled, one CNC can connect up to ten FTP clients.
For the DataServer Explorer connection, see Section 2.7, "DATASERVER Explorer CONNECTION," in Part II, "SPECIFICATION."
3 The Data Server functions (FTP clients) of Series 30*i*/31*i*/32*i*-A do not support passive mode (PASV command).
4 When many programs are registered in the memory card for the Data Server functions, it may take time to display a file list or register a file.
5 When many files are registered in the host computer, it may take time to display a file list on the DATA SERVER HOST FILE LIST screen.
In this case, take action, such as dividing the directory containing registered files.

2.1 OPERATING THE DATA SERVER SETTING SCREEN

This section describes the setting screen for operating the Data Server functions.

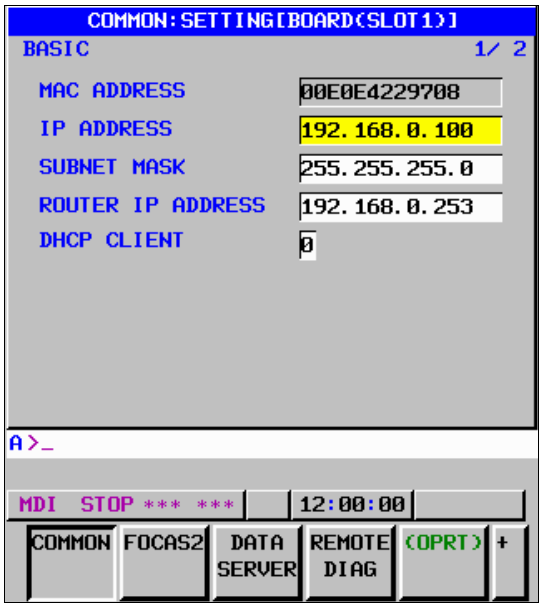
Procedure

1 Press the function key

.
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*-B, or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)
3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4 Press soft keys [COMMON] and [DATA SERVER] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")
DHCP CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit6 (DHC) of parameter No.904 related to the DHCP client function is displayed, and the setting is also possible. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

Display item

Item	Description
MAC ADDRESS	Fast Ethernet/Fast Data Server MAC address

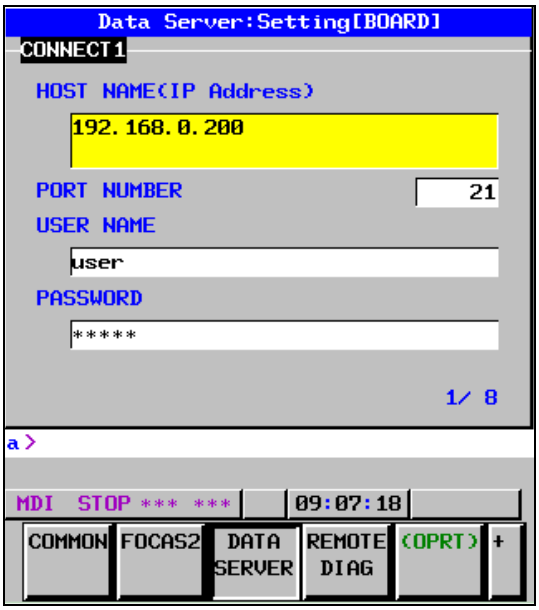
NOTE

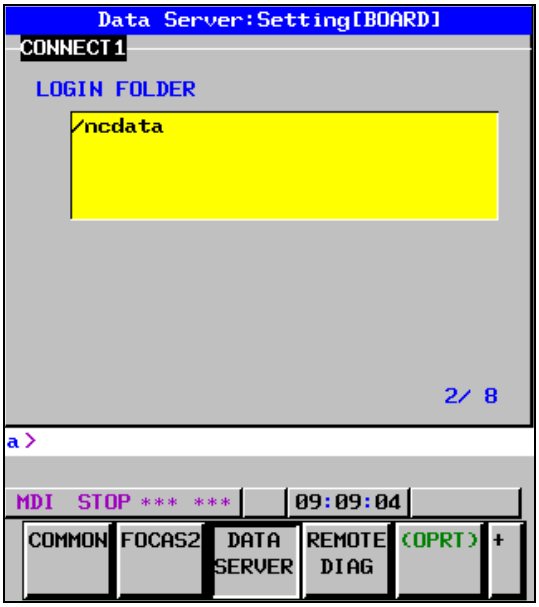
The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

Data Server screens (CONNECT 1, CONNECT 2, CONNECT 3)

Press soft key [DATA SERVER] to display the Data Server screen.

By using page keys [PAGE ⇧] [PAGE ⇩], the three host computers at connection destinations 1, 2, and 3 can be set.





Data Server screens (for connection destination 1)

Setting item

Item	Description
HOST NAME	Specify the IP address of the host computer. (Example of specification format: "192.168.0.200")
PORT NUMBER	Specify the port number. Usually, set 21 because the FTP communication is used.
USER NAME	Specify the name of the user to log on to the host computer using FTP. (A user name of up to 31 characters can be specified.) Be sure to set the user name.
PASSWORD	Specify the password for the above user name. The password must always be specified.
LOGIN FOLDER	Specify a work folder to be used when the user logs in to the host computer. (Up to 127 characters can be specified.) If no data is set, the home folder set on the host computer is used as a login folder.

Operation

Select a connection destination.

1 Press soft key [(OPRT)] to display soft key [HOST SELECT]. Then, press soft key [HOST SELECT] to display soft keys [CONECT 1], [CONECT 2], and [CONECT 3].

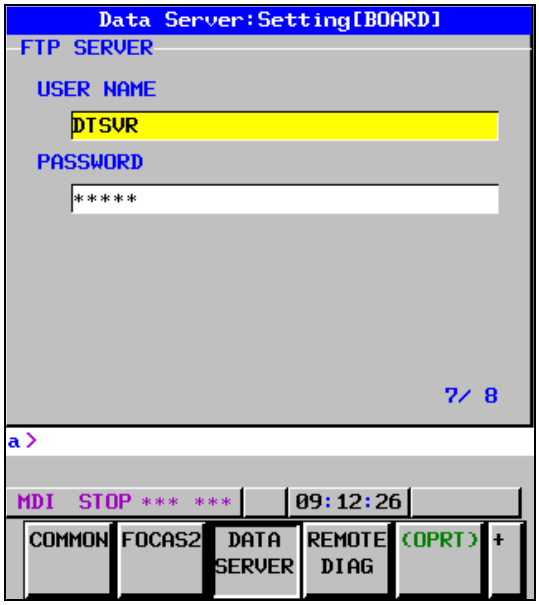
2 Press one of soft keys [CONECT 1], [CONECT 2], and [CONECT 3] according to the host computer to which you want to make a connection. The screen title of connection destination 1, 2 or 3 is displayed in reverse video. The screen title displayed in reverse video indicates the connection destination host computer.

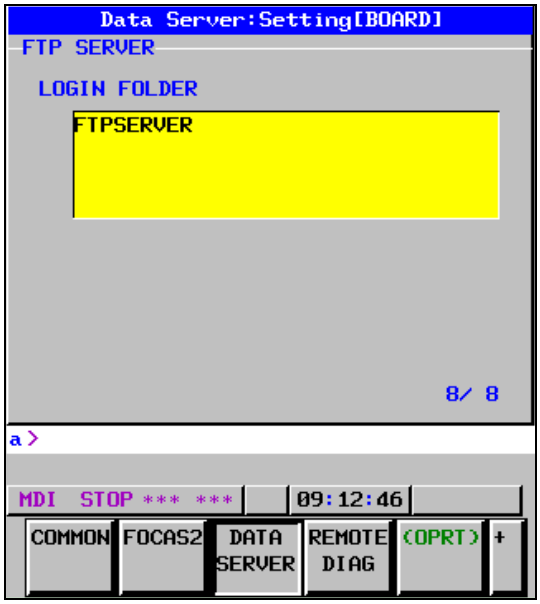
When connection destination 1 is selected

Data Server screens (FTP SERVER)

Press soft key [DATA SERVER] to display the Data Server screen.

By using page keys [PAGE ⇧] [PAGE ⇩], the FTP server setting screen is displayed after the connection destination 1, 2, or 3 screen.





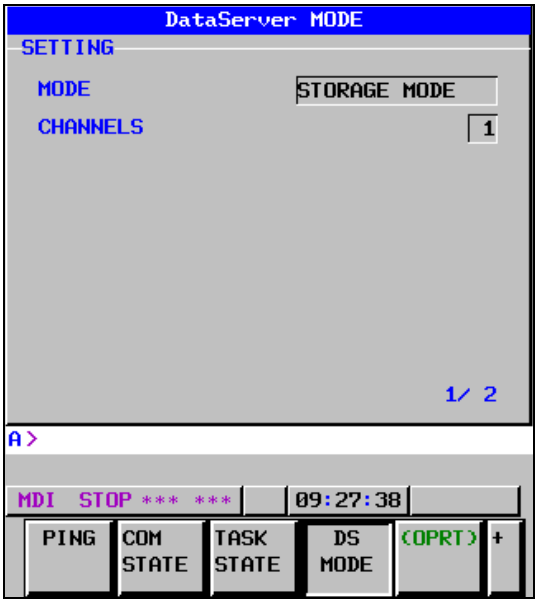
Data Server screens (FTP SERVER)

Setting item

Item	Description
USER NAME	Specify a user name to be used when the host computer logs in to the Data Server. (A user name of up to 31 characters can be specified.) Be sure to set the user name.
PASSWORD	Specify the password for the above user name. The password must always be specified.
LOGIN FOLDER	Specify a work folder to be used when the host computer logs in to the Data Server. (Up to 127 characters can be specified.) If no data is set, the home folder (home directory) is used as a login folder.

Data Server MODE screen (SETTING)

Press soft key [DS MODE] to display the Data Server MODE screen (SETTING). The current mode can be checked and changed.



Data Server screen (SETTING)

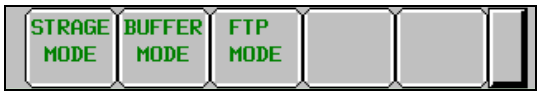
Display item

Item	Description
CHANNELS	Displays the number of channels currently being used.
MODE	Displays the currently set Data Server mode. STORAGE MODE FTP MODE BUFFER MODE

Operation

The Data Server mode can be changed.

1 Press soft key [(OPRT)] to display soft keys [STRAGE MODE], [FTP MODE], and [BUFFER MODE].



2 To change the mode to a desired mode, press the soft key of the desired mode.

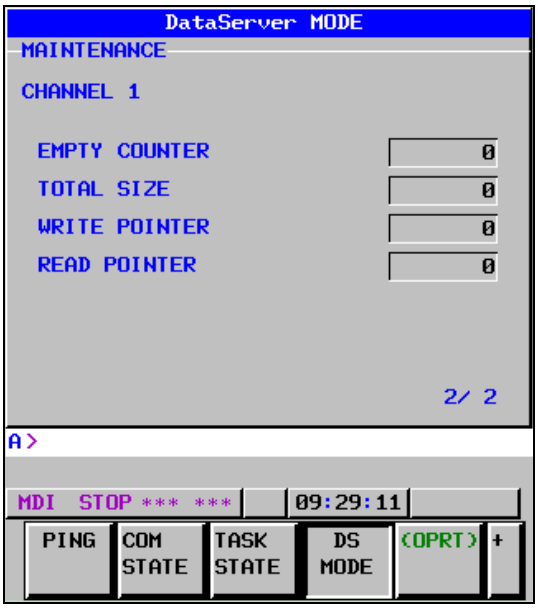
NOTE

1 With the Series 30*i*/31*i*-A, to use the buffer mode, the buffer mode function option (J728) is required.

2 With the Series 32*i*-A, the buffer mode cannot be used.

Data Server MODE screen (MAINTENANCE)

Press soft key [DS MODE] and press page keys [PAGE ⇧] [PAGE ⇩] to display maintenance information for each channel.



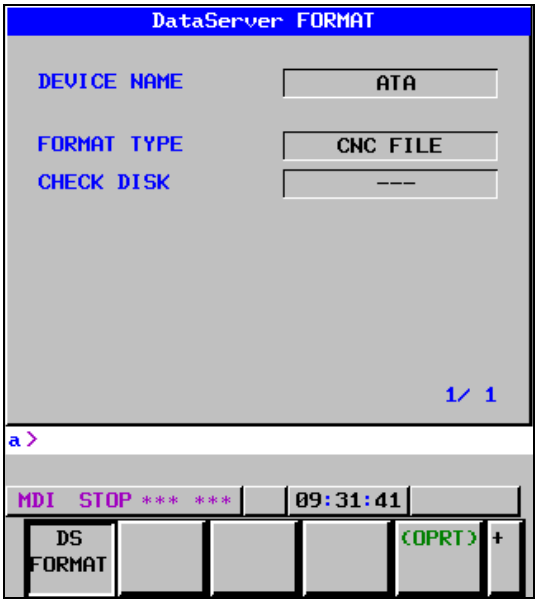
Data Server MODE screen (MAINTENANCE)

Display item

Item	Description
CHANNEL	Interface number of the buffer used for transferring NC programs between the CNC and Data Server. For example, a channel is assigned to each path.
EMPTY COUNTER	Used for maintenance. This item indicates the number of cases where the buffer becomes empty while NC programs are being transferred from the Data Server to the CNC.
TOTAL SIZE	Used for maintenance. This item indicates the total number of bytes transferred when an NC program is transferred from the Data Server.
WRITE POINTER READ POINTER	Used for maintenance. This item indicates the buffer use status when NC programs are transferred from the Data Server to the CNC.

Data Server FORMAT screen

Press soft key [DS FORMAT] to display the format screen of the memory card built into the Data Server.



Data Server FORMAT screen

Display item

Item	Description
DEVICE NAME	Indicates the storage media currently being used by the Data Server. "ATA" or "NONE" is indicated. ATA : A memory card is mounted. None : No memory card is mounted.
FORMAT TYPE	Indicates the format type of the memory card. "CNC FILE" or "---" is displayed. When "---" is displayed, check whether the memory card is mounted properly and is formatted correctly.
CHECK DISK	Indicates the check result. When no check is made : "-----" When the check result is normal : "OK" When the check result is abnormal : "NG"

Procedure (CHECK DISK)

1 Press soft key [(OPRT)] then soft key [CHECK DISK].

2 Press soft key [EXEC] to check the format of the memory card and display the check result.

> ⚠ **CAUTION**
> If the check result is abnormal, determine the cause of trouble from an error message displayed on the ETHERNET LOG screen and back up the files stored on the memory card immediately. Then, try to reformat the memory card.

NOTE
1 An error occurs if other Data Server functions are operated when a check disk is made.
2 Also when a program on the memory card of the Data Server is selected as a main program, the check disk operation cannot be performed.

Procedure (CNC FORMAT)

1 Press soft key [(OPRT)] then soft key [CNC FORMAT].

2 Press soft key [EXEC] to format the memory card built into the Fast Data Server.

⚠ CAUTION
1 Do not turn off the power to the CNC when the memory card is being formatted. Otherwise, the memory card can be damaged.
2 When the memory card is formatted, all files held on the memory card are erased.

NOTE
1 An error occurs if other Data Server functions are operated when the memory card is formatted.
2 Also when a program on the memory card of the Data Server is selected as a main program, the memory card cannot be formatted.

2.2 RELATED NC PARAMETERS

The NC parameters related to the Data Server functions are described below.

	#7	#6	#5	#4	#3	#2	#1	#0
0000								TVC

[Input type] Setting input
[Data type] Bit path

#0 TVC When a file is transferred from the personal computer to the Data Server, a TV check is:
0: Not performed.
1: Performed.

NOTE
This parameter is valid only for text files.
For text files, see Subsection 3.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."

0020	I/O CHANNEL : Input/output device selection

[Input type] Setting input
[Data type] Byte
[Valid data range] 5 : Selects the Data Server as the input/output device.

	#7	#6	#5	#4	#3	#2	#1	#0
0100					NCR	CRF	CTV	

[Input type] Setting input
[Data type] Bit

#1 CTV When a file is transferred from the personal computer to the Data Server, character counting for the TV check in program comment parts is:
0: Performed.
1: Not performed.

#2 CRF When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0: Set as specified by parameter NCR (bit 3 of parameter No. 100).
1: Set to "CR" "LF".

#3 NCR When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0: Set to "LF" "CR" "CR".
1: Set to "LF".

> **NOTE**
> This parameter is valid only for text files.
> For text files, see Subsection 3.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."

	#7	#6	#5	#4	#3	#2	#1	#0
0904	LCH							BWT

[Input type] Parameter input
[Data type] Bit

#0 BWT If FTP communication is behind data supply during DNC operation in the buffer mode of the Data Server:
0: An error is caused.
1: No error is caused and DNC operation continues after waiting the completion of FTP communication.

#7 LCH In the LIST-GET service of the Data Server, when a list file specifies 1025 or more files:
0: A check for duplicated file names is performed.
1: A check for duplicated file names is not performed.

	#7	#6	#5	#4	#3	#2	#1	#0
0905					DSF		PCH	

[Input type] Parameter input
[Data type] Bit

#1 PCH At the start of communication of the Data Server, FTP file transfer function, or machine remote diagnosis functions, checking for the presence of the server using PING is:
0: Performed.
1: Not performed.

NOTE
Usually, set Performed (0).
When the presence of the server using PING is not checked by setting 1, it may take several tens of seconds until an error is recognized due to no server on the network.
For mainly security reasons, a personal computer may be set so that it does not respond to the PING command. Set 1 when the Data Server communicates with such a personal computer.

#3 DSF When an NC program is stored on the memory card of the Data Server:
0: The file name takes priority.
1: The program name in the NC program takes priority.

NOTE
This parameter is valid only when files on a personal computer are registered as text files on the memory card on the Data Server by CNC operation.

	#7	#6	#5	#4	#3	#2	#1	#0
0906	FSP	EXP	SCM		PSV	OVW		

[Input type] Parameter input
[Data type] Bit

#2 OVW When the Data Server is operated as an FTP server, if a file having the same name as a file to be transferred from the FTP client is already stored in the memory card of Data Server:
0: An error is caused.
1: No error is caused and the existing file is overwritten.

NOTE
To use this parameter, the DataServer Explorer connection option (R953) is required.

#3 PSV The FTP clients of the Data Server functions or FTP file transfer function operate in:
0: Active mode.
1: Passive mode.

NOTE
1 When this parameter is set, the power must be turned off before operation is continued.
2 This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

#5 SCM As the mode for accessing the memory card on the Data Server:
0: The mode supported by the memory card that is automatically determined is used.
1: The conventional PIO mode 2 is used.

NOTE
1 When this parameter is set, the power must be turned off before operation is continued.
2 This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

#6 EXP When the Data Server operates as an FTP server and an FTP client performs GET operation of a text file in the binary mode, EOB (end of block) is:
0: Set as specified by bits 2 (CRF) and 3 (NCR) of parameter No. 100.
1: Set to "LF".

NOTE
1 Usually, set to 0
When this parameter is set to 0, if a specific FTP client such as Windows Explorer attempts to get a text file, the text file may be incorrect. When using such an FTP client, set this parameter to 1.
2 To any file obtained when this parameter is set to 1, no blank for a TV check is added. The file may not be able to be input a CNC for which a TV check is to be performed.

#7 FSP When the Data Server is operated as an FTP server and an NC program is stored on the memory card on the Data Server:
0: The file name takes priority.
1: The program name in the NC program takes priority.

NOTE
This parameter is valid only when files on a personal computer are registered as text files on the memory card on the Data Server by personal computer operation.
When this parameter is set to ”1”, a file is registered with the program name in the NC program even if a request is made to rename and register the file on the personal computer.

	#7	#6	#5	#4	#3	#2	#1	#0
0908								ISO

[Input type] Setting input
[Data type] Bit

#0 ISO When a Data Server is selected as an I/O device, data input/output is performed using
0: ASCII codes.
1: ISO codes.

NOTE
This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

	#7	#6	#5	#4	#3	#2	#1	#0
0909								HDS

[Input type] Parameter input
[Data type] Bit

NOTE
When this parameter is set, the power must be turned off before operation is continued.

#0 HDS High-speed file search in the DATA SERVER HOST FILE LIST screen is:
0: Disabled.
1: Enabled.

NOTE
1 File search operation differs depending on the setting of this parameter.
- When "0" is set, a file name starting with the search string is searched for.
- When "1" is set, file names are searched for an exact match for the search string. If no exact match is found, a file name starting with the search string is searched for.

For example, assume that files ABCD, AAA, ABC, and BBB are listed and the search string is "ABC". When "0" is set, "ABCD" is found. When "1" is set, "ABC" is found.

2 When this parameter is set to "1", a file may not be able to be searched for correctly in the DETAIL ON mode, depending on the FTP server software used. In this case, perform a search in the DETAIL OFF mode.

0921	**Selects the host computer 1 OS.**
0922	**Selects the host computer 2 OS.**
0923	**Selects the host computer 3 OS.**

[Input type] Parameter input
[Data type] Word
[Valid data range] 0 to 2
0: Windows.
1: UNIX/VMS.
2: Linux.

NOTE
Some FTP server software may not depend on the OS. Therefore, the valid file list may not be displayed by the above setting.

0924	**FOCAS2/Ethernet function wait time setting**

[Input type] Parameter input
[Data type] Word
[Unit of data] msec
[Valid data range] 0 to 32767
Specifies the wait time (in 1 ms units) for the FOCAS2/Ethernet service when it is used together with the Data Server functions.
If 0 is specified, a wait time of 1 ms is assumed.

0929	**Specifies the attribute of the file to be transferred in operating as an FTP server.**

[Input type] Parameter input

[Data type] Word
[Valid data range] 0 to 2
Specifies whether to use the file attribute specified in the FTP TYPE command when the Data Server operates as an FTP server.

No.929	Meaning
0	Uses the file attribute specified in the TYPE command from the FTP client.
1	Fixes the attribute to text.
2	Fixes the attribute to binary.

0930	Maximum number of files that can be registered to the memory card of the Data Server and maximum size per file that can be registered

[Input type] Parameter input
[Data type] Word
[Valid data range] 0, 10 to 15

No.930	Maximum number of files	Maximum size per file
0	2047	512MB
10	511	2048MB
11	1023	1024MB
12	2047	512MB
13	4095	256MB
14	8191	128MB
15	16383	64MB

NOTE
1 When the memory card is formatted after this parameter is set, the maximum number of files and maximum size per file are changed.
2 Each folder is counted as one file.
3 This parameter is valid when the series and edition of the Data Server function software are edition 11 or later of series 6569.

	#7	#6	#5	#4	#3	#2	#1	#0
3107				SOR				

[Input type] Setting input
[Data type] Bit path

#4 SOR In the Data Server FILE LIST screen, files are displayed:
0: In the order of zero-suppressed program number.
1: In the order of program name.

	#7	#6	#5	#4	#3	#2	#1	#0
3233							PDM	

[Input type] Parameter input
[Data type] Bit

#1 PDM When the Data Server FILE LIST screen is displayed:
0: The setting of an M198 operation folder/DNC operation file is enabled.
1: The setting of a foreground/background folder is enabled.

NOTE
When an M198 external subprogram call or DNC operation is performed on the Data Server, set this bit to 0.
For the foreground and background folders, refer to Chapter, "PRODUCT MANAGEMENT" in the OPERATOR'S MANUAL of the CNC.

	#7	#6	#5	#4	#3	#2	#1	#0
11374				PCB	PCP			

[Input type] Parameter input
[Data type] Bit

#3 PCP In the program folder screen, the programs are copied or moved
0: By the old method.
1: By the new method like PC.

NOTE
1 This parameter is only available with the Series 30*i*/31*i*/32*i*-A.
2 To use this parameter, the machining program/execution command dual display option (R718) is required.

#4 PCB In the program folder screen, the programs are copied or moved
0: By the new method.
1: By the old method.

NOTE
This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

	#7	#6	#5	#4	#3	#2	#1	#0
24309							DUC	

[Input type] Parameter input
[Data type] Bit

#1 DUC Between the Data Server and USB memory,
0: Only data can be copied.
1: Data and programs can be copied.

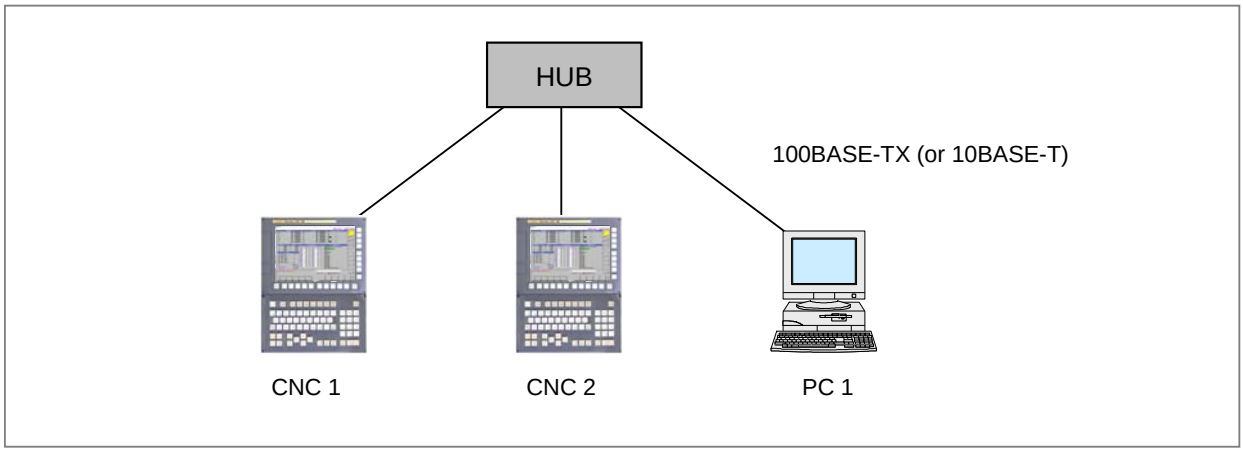
⚠ WARNING
When a file containing multiple programs is copied from the USB memory to the Data Server, the file is not divided into the programs and the programs are not registered individually on the Data Server. The programs are registered as one series of programs. Be sure to copy a file containing one program. Operating the machine after copying a file containing multiple programs is dangerous because the machine may behave unexpectedly.

NOTE

This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

2.3 EXAMPLE OF SETTING THE DATA SERVER FUNCTIONS

An example of setting for operating the Data Server functions is given below. In this example of setting, one personal computer is connected to two CNCs through a Data Server.



		CNC 1	CNC 2
IP ADDRESS		192.168.0.100	192.168.0.101
SUBNET MASK		255.255.255.0	255.255.255.0
ROUTER IP ADDRESS		None	None
CONNECT 1	PORT NUMBER	21	21
	IP ADDRESS	192.168.0.200	192.168.0.200
	USER NAME	user	user
	PASSWORD	user	user
	LOGIN FOLDER	None	None
DATA SERVER MODE		Storage	Storage
Parameter NO. 20		5	5

The common setting screen is used for setting.

The Data Server setting screen is used for setting.

The Data Server mode setting screen is used for setting.

NC parameter setting

	PC 1
IP address	192.168.0.200
Sub-net mask	255.255.255.0
Default gateway	None
User name	user
Password	user
Home folder	default

"Microsoft TCP/IP property" of the personal computer (Windows) is used for setting.

"User account" of the personal computer (Windows) is used for setting.

"Internet service manager" of the personal computer (Windows) is used for setting.

3 SETTING THE FOCAS2/Ethernet FUNCTIONS

This chapter describes the setting of parameters for the FOCAS2/Ethernet functions and CNC screen display functions.

> ⚠ **WARNING**
> Before using the FOCAS2/Ethernet functions, fully understand the instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual.
> If you start operation before fully understanding them, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

> ⚠ **CAUTION**
> Before performing communication using the FOCAS2/Ethernet functions for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network.
> Be very careful about any communication failure. If the FOCAS2/Ethernet functions are used on a network involved with a communication failure, a communication failure intermittently occurs in FOCAS2/Ethernet, which may cause a CNC system error.

Note on using the FOCAS2/Ethernet functions

> **NOTE**
> With the FOCAS2/Ethernet functions, up to 20 FOCAS2/Ethernet clients can be connected to one CNC.

Note on using the CNC screen display functions

> **NOTE**
> With the CNC screen display functions, up to 1 CNC screen display function client can be connected to one CNC.

3.1 OPERATING THE FOCAS2/Ethernet SETTING SCREEN

This section describes the setting screen for operating the FOCAS2/Ethernet functions and CNC screen display functions.

Procedure

1 Press the function key

.

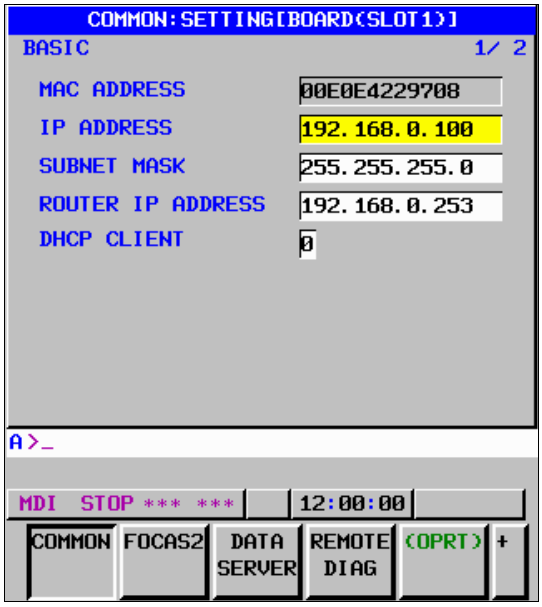
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)

3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.

4 Press soft keys [COMMON] and [FOCAS2] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet/ Fast Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")
DHCP CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit6 (DHC) of parameter No.904 related to the DHCP client function is displayed, and the setting is also possible. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

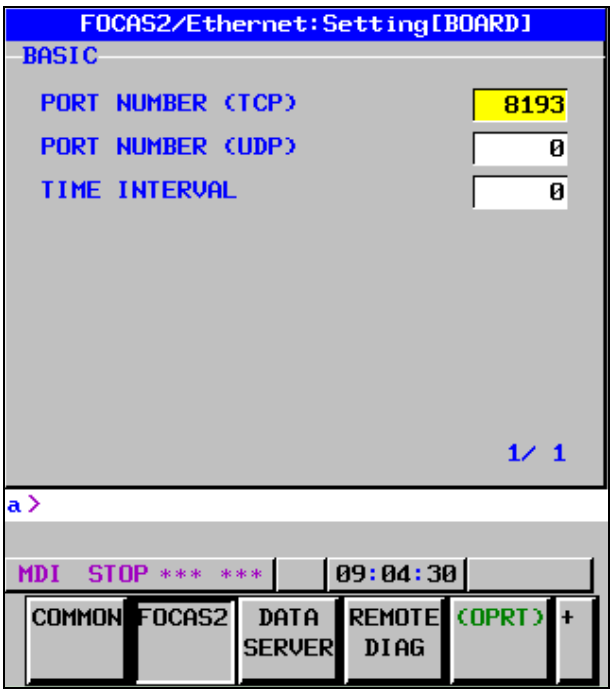
Display item

Item	Description
MAC ADDRESS	Fast Ethernet/ Fast Data Server MAC address

NOTE
The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION" provided later.

FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.



FOCAS2 screen

Setting item

Item	Description
PORT NUMBER (TCP)	Specifies the port No. to be used by the FOCAS2/Ethernet functions and CNC screen display functions, within a range of 5001 to 65535.
PORT NUMBER (UDP)	Set 0.
TIME INTERVAL	Set 0.

3.2 RELATED NC PARAMETERS

0020	I/O CHANNEL : Input/output device selection

[Input type] Setting input
[Data type] Byte
[Valid data range] 6 : Selects the FOCAS2/Ethernet as the input/output device. This parameter is required only for DNC operation, however.

	#7	#6	#5	#4	#3	#2	#1	#0
0905								DNE

[Input type] Parameter input
[Data type] Bit

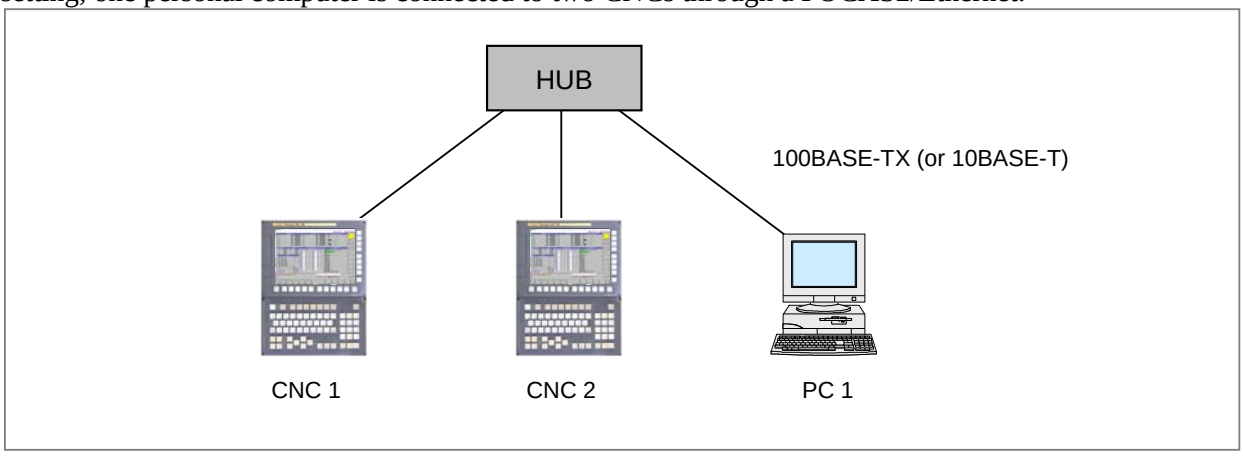
#0 DNE During DNC operation using the FOCAS2/Ethernet functions, the termination of DNC operation is:
0: Waited.
1: Not waited. (FOCAS2/HSSB compatible specification)

0924	FOCAS2/Ethernet waiting time setting

[Input type] Parameter input
[Data type] Word
[Unit of data] msec
[Valid data range] 0 to 32767
When the FOCAS2/Ethernet and Data Server functions are used simultaneously, this parameter sets the FOCAS2/Ethernet function waiting time in milliseconds.
When a value of 0 is set, the functions operate with assuming that 1 millisecond is specified.

3.3 EXAMPLE OF SETTING THE FOCAS2/Ethernet FUNCTIONS

An example of setting for operating the FOCAS2/Ethernet functions is given below. In this example of setting, one personal computer is connected to two CNCs through a FOCAS2/Ethernet.



	CNC 1	CNC 2
IP ADDRESS	192.168.0.100	192.168.0.101
SUBNET MASK	255.255.255.0	255.255.255.0
ROUTER IP ADDRESS	None	None
PORT NUMBER (TCP)	8193	8193
PORT NUMBER (UDP)	0	0
TIME INTERVAL	0	0

The common setting screen is used for setting.

The FOCAS2 setting screen is used for setting.

		PC 1
IP address		192.168.0.200
Sub-net mask		255.255.255.0
Default gateway		None
CNC 1	NC IP address	192.168.0.100
	NC TCP port number	8193
CNC 2	NC IP address	192.168.0.101
	NC TCP port number	8193

"Microsoft TCP/IP property" of the personal computer (Windows) is used for setting.

Specify these items with the arguments of the data window library function "cnc_allclibhnd13."

4 SETTING THE DNS/DHCP FUNCTION

This chapter describes the setting of the DNS/DHCP function.

4.1 SETTING OF DNS

This section describes the setting procedure for operating DNS client function.

Procedure

1 Enable the DNS client function according to Section 4.3, "RELATED NC PARAMETERS" provided later. With Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F, also this function can be enabled by setting "1" to the DNS CLIENT in the COMMON screen (DETAIL).

2 Set up the DNS server on the host computer. For information about setup, see Appendix C, "EXAMPLE OF DNS/DHCP SETUP."

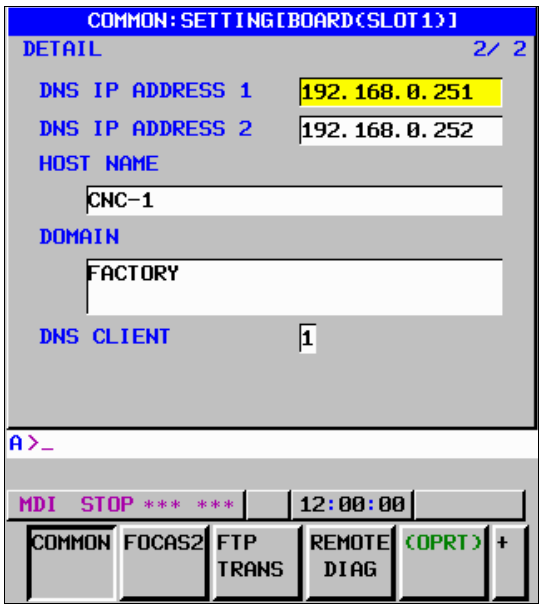
3 Make a connection to the host computer where the DNS server operates (hereinafter referred to as the "DNS server") and restart the CNC, then press the function key SYSTEM.

4 Press soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F), then press [COMMON] to display the COMMON (DETAIL) screen.

5 As the DNS IP address, enter the IP address of the DNS server.

COMMON screen (DETAIL)

Press soft key [COMMON] then page keys PAGE ⇧ PAGE ⇩ to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DNS CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (DETAIL)

Setting item

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.
DNS CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit5 (DNS) of parameter No.904 related to the DNS client function is displayed, and the setting is also possible. See "RELATED NC PARAMETERS", which will be seen later.

4.2 SETTING OF DHCP

This section describes the setting procedure for operating DHCP client function.

Procedure

1 Enable the DHCP client function according to Section 4.3 "RELATED NC PARAMETERS" provided later. With Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F, also this function can be enabled by setting "1" to the DHCP CLIENT in the COMMON screen (BASIC).

2 Set up the DHCP server on the host computer. For information about setup, see Appendix C, "EXAMPLE OF DNS/DHCP SETUP."

3 Make a connection to the host computer where the DHCP server operates (hereinafter referred to as the "DHCP server") and restart the CNC, then press the function key SYSTEM.

4 Press soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F), then press [COMMON] to display the COMMON screen.

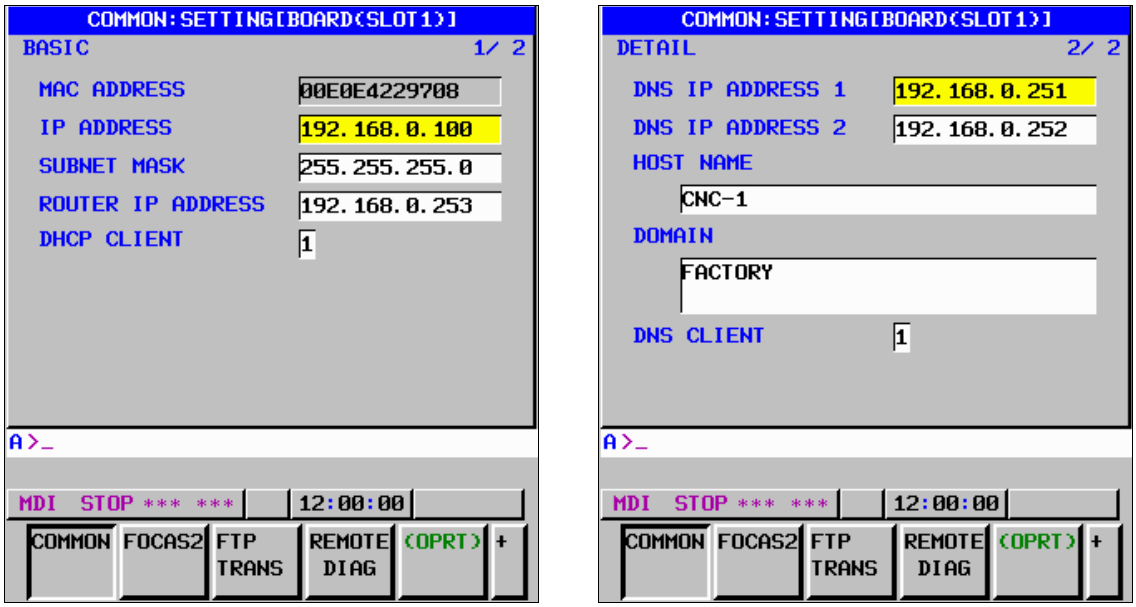
5 If the DHCP client function of the CNC is enabled and a connection is made successfully with the DHCP server, the following items are set automatically from the DHCP server:
- IP ADDRESS
- SUBNET MASK
- ROUTER IP ADDRESS
- DNS IP ADDRESS
- DOMAIN

If an attempt to make a connection with the DHCP server fails, "DHCP ERROR" is indicated in each item.

6 Moreover, if the DNS client function is enabled at the same time and the DHCP server interacts with the DNS server (the DNS server supports dynamic DNS), enter a desired host name.

COMMON screens (BASIC, DETAIL)

Press soft key [COMMON] then page keys PAGE ⇧ PAGE ⇩ to display the COMMON screens (BASIC and DETAIL). If a connection is made successfully with the DHCP server and setting data is acquired, the following is displayed:
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” and “DNS CLIENT” are not displayed for Series 30*i*/31*i*/32*i*-A.)

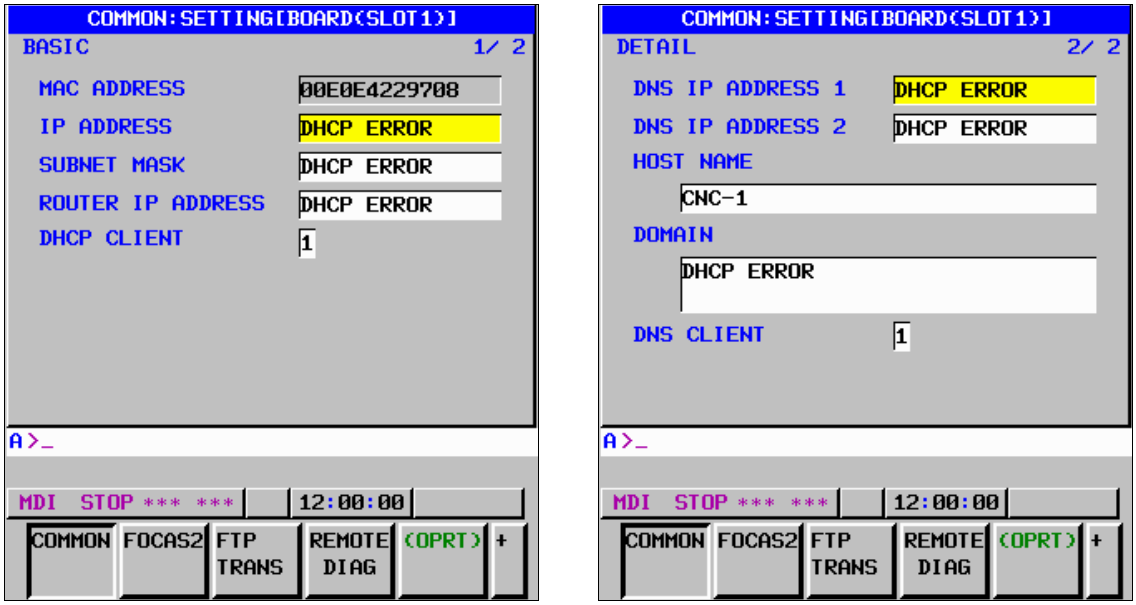


When a connection with the DHCP server has been made successfully

If no host name is set, the CNC automatically sets a host name in the format "NC-<MAC address>".

Example of host name automatically set

If an attempt to make a connection with the DHCP server fails, the following is displayed:



When an attempt to make a connection with the DHCP server has failed

Check item

Item	Description
IP ADDRESS SUBNET MASK ROUTER IP ADDRESS DNS IP ADDRESS 1, 2 DOMAIN	If a connection is made successfully with the DHCP server, data acquired from the DHCP server is displayed. If an attempt to make a connection with the DHCP server fails, "DHCP ERROR" is displayed.

Setting item

Item	Description
HOST NAME	Enter a desired CNC host name. If the DHCP server interacts with the DNS server, this host name is posted to the DNS server. If no host name is set, "NC-<MAC address>" is automatically set. Example of host name automatically set: NC-00E0E4004CF9
DNS CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit5 (DNS) of parameter No.904 related to the DNS client function is displayed, and the setting is also possible. See "RELATED NC PARAMETERS", which will be seen later.

Display item

Item	Description
MAC ADDRESS	Fast Ethernet/Fast Data Server MAC address

4.3 RELATED NC PARAMETERS

	#7	#6	#5	#4	#3	#2	#1	#0
0904		DHCP	DNS					

[Input type] Parameter input
[Data type] Bit

#5 DNS The DNS client function is:
0: Not used.
1: Used.
With Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F, this value is also displayed to the DNS CLIENT in the COMMON screen (DETAIL) of FOCAS2/Ethernet setting screen [MULTI-FUNC ETHER] or [BOARD], and the setting is also possible.

#6 DHC The DHCP client function is:
0: Not used.
1: Used.
With Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F, this value is also displayed to the DHCP CLIENT in the COMMON screen (BASIC) of FOCAS2/Ethernet setting screen [MULTI-FUNC ETHER] or [BOARD], and the setting is also possible.

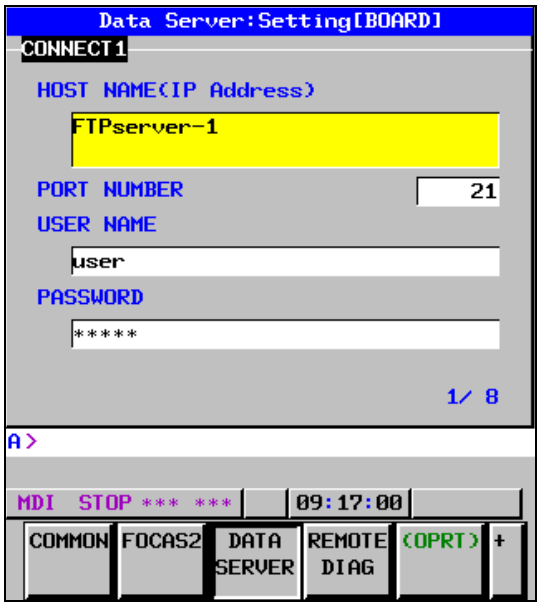
NOTE
When at least one of these parameters is set, the power must be turned off before operation is continued.

4.4 EXAMPLE OF SETTING DNS/DHCP

NOTE
This section provides examples of setting for Windows 2000 Server which supports dynamic DNS.

4.4.1 When DNS/DHCP is Used with the Data Server

When a connection is made with the FTP server of the host computer (hereinafter referred to as the "FTP server") by using the Data Server function, the IP address of the CNC can be set from the DHCP server by enabling the DHCP client function of the CNC.
Moreover, by enabling the DNS client function of the CNC, an FTP server can be specified with a host name instead of an IP address.



Example of specifying a connection destination with a host name (FTPServer-1)

Setting the DNS server / DHCP server

Setting the DHCP server

In the database of the DHCP server, set the following items:

- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.
For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.
For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the FTP server

For FTP server setting, see Appendix B, "EXAMPLE OF FTP SERVER SETUP."

Setting the CNC

Parameter

To enable the DNS client function, set bit 5 of parameter No. 904 to 1.
To enable the DHCP client function, set bit 6 of parameter No. 904 to 1.

4.4.2 When DHCP is Used with the FTP Server Function of the Data Server

The Data Server (FTP server function) can be accessed by specifying a host name from an FTP client where an FTP client operates (hereinafter referred to as an "FTP client"), using the interaction between the DHCP server and DNS server operating with Windows 2000 Server.
The DHCP client function of the CNC is enabled.

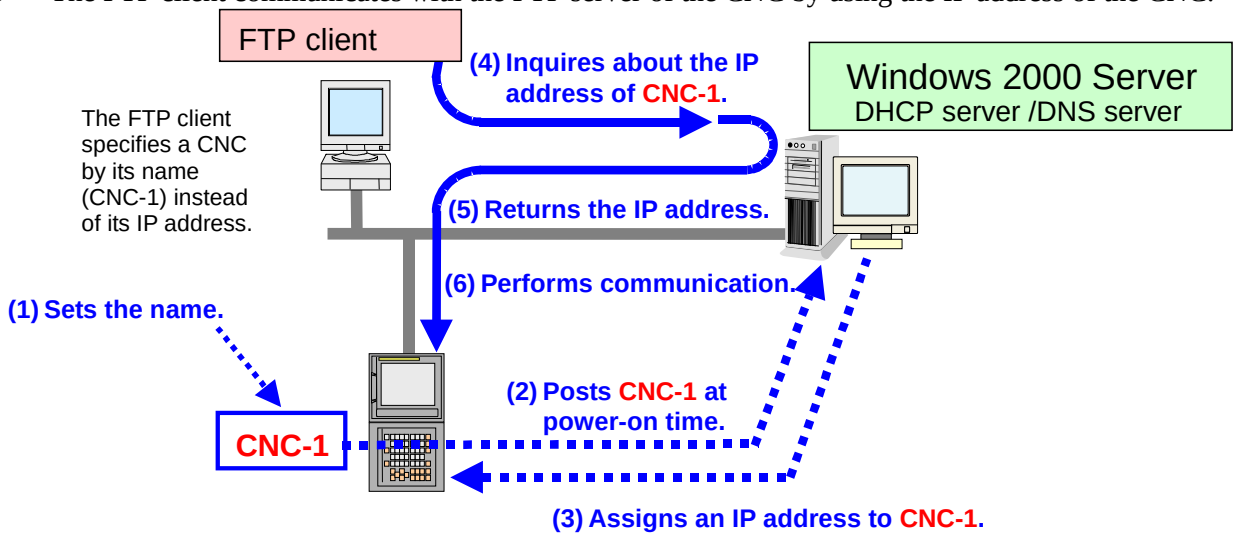
Flow of operation

When the system is initialized or the system configuration is modified

1 A host name is set on the CNC.
2 When the power is turned on, the Data Server posts the host name to the DHCP server.
3 The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When operation is performed from an FTP client

1 An FTP client inquires of the DNS server about the IP address of a CNC.
2 The FTP client acquires the IP address of the CNC.
3 The FTP client communicates with the FTP server of the CNC by using the IP address of the CNC.



Setting the DNS server/DHCP server

Setting the DHCP server

In the database of the DHCP server, set the following items:

- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.
For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.
For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the CNC

Parameter

To enable the DHCP client function, set bit 6 of parameter No. 904 to 1.
As a host name, set a desired name. Otherwise, a name automatically set by the Fast Ethernet/Fast Data Server is used.

4.4.3 When DHCP is Used with the FOCAS2/Ethernet Function

Ethernet parameters can be set with no setting performed from the CNC, using the interaction between the DHCP server and DNS server operating with Windows 2000 Server.
The DHCP client function of the CNC is enabled.

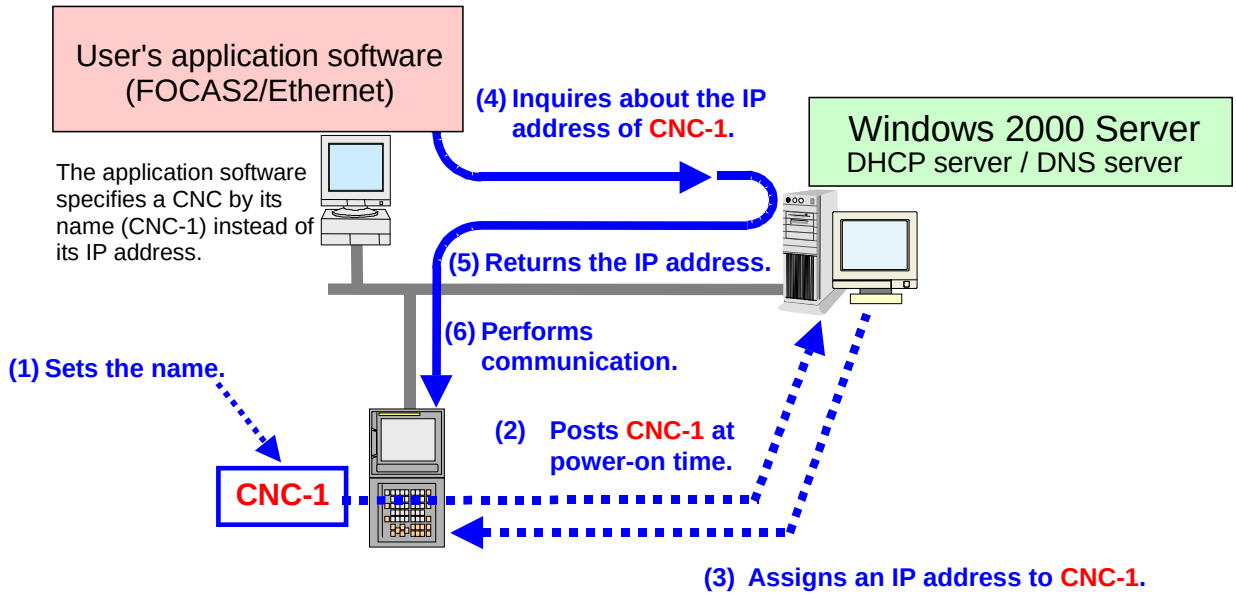
Flow of operation

When the system is initialized or the system configuration is modified

1 A host name is set on the CNC.
2 When the power is turned on, the CNC posts the host name to the DHCP server.
3 The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When FOCAS2/Ethernet application software is executed

1 The user's application inquires of the DNS server about the IP address of a CNC.
2 The user's application acquires the IP address of the CNC.
3 The user's application communicates with the CNC by using the IP address of the CNC.



Setting the DNS server/DHCP server

Setting the DHCP server

In the database of the DHCP server, set the following items:

- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.
For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the CNC

Parameter

To enable the DHCP client function, set bit 6 of parameter No. 904 to 1.
As a host name, set a desired name. Otherwise, a name automatically set by the Fast Ethernet/Fast Data Server is used.
When the DHCP function is enabled, the FOCAS2/Ethernet-related parameters are automatically set if bit 3 of parameter No. 904 is set to 0. If bit 3 of parameter No. 904 is set to 1, the parameters for *i* CELL communication are automatically set.

5 SETTING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

This chapter describes the setting of parameters for the machine remote diagnosis functions.
For explanation of the entire machine remote diagnosis functions, refer to "Machine Remote Diagnosis Package OPERATOR'S MANUAL (B-63734EN)."

5.1 OPERATING THE MACHINE REMOTE DIAGNOSIS SETTING SCREEN

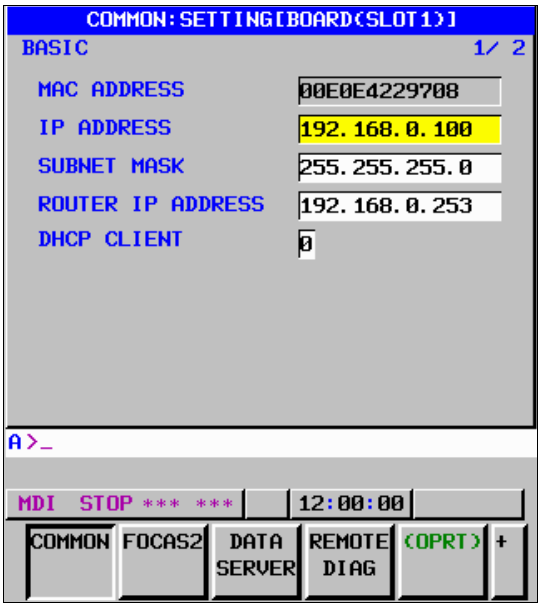
This section describes the setting screen for operating the machine remote diagnosis functions.

Procedure

1 Press the function key .
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)
3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4 Press soft keys [COMMON], [FOCAS2], and [REMOTE DIAG] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet / Fast Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")
DHCP CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit6 (DHC) of parameter No.904 related to the DHCP client function is displayed, and the setting is also possible. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

Display item

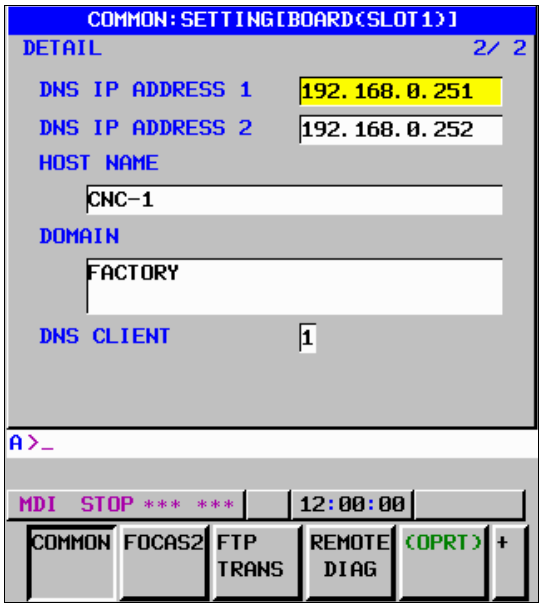
Item	Description
MAC ADDRESS	Fast Ethernet / Fast Data Server MAC address

NOTE

The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4 "SETTING THE DNS/DHCP FUNCTION".

COMMON screen (DETAIL)

Press soft key [COMMON] then page keys [PAGE ⇧] [PAGE ⇩] to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DNS CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



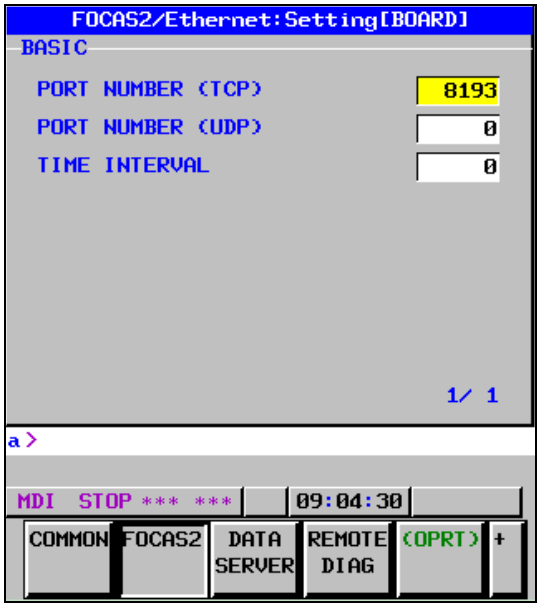
COMMON screen (DETAIL)

Setting item

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.
DNS CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit5 (DNS) of parameter No.904 related to the DNS client function is displayed, and the setting is also possible. See "RELATED NC PARAMETERS", which will be seen later.

FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.



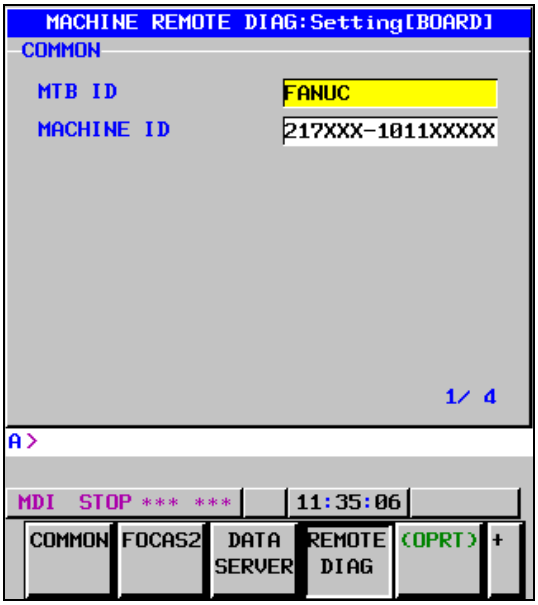
FOCAS2 screen

Setting item

Item	Description
PORT NUMBER (TCP)	Specifies the port No. to be used by the machine remote diagnosis functions (FOCAS2/Ethernet functions), within a range of 5001 to 65535.
PORT NUMBER (UDP)	Set 0.
TIME INTERVAL	Set 0.

MACHINE REMOTE DIAG screen (COMMON)

Press soft key [REMOTE DIAG] to display the MACHINE REMOTE DIAG screen (COMMON).



Machine remote diagnosis screen (BASIC)

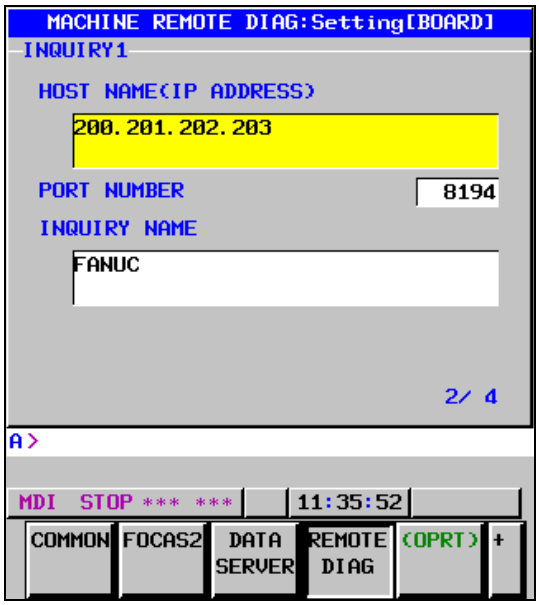
Setting item

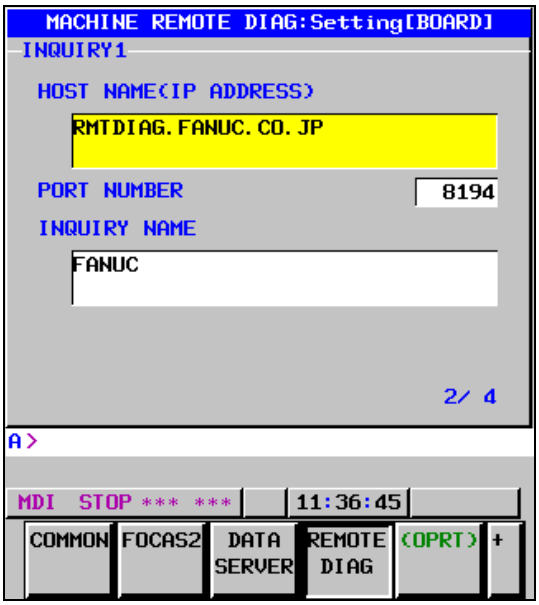
Item	Description
MTB ID	This information is required by the machine remote diagnosis package to confirm that the diagnosis request is issued from a machine manufactured by the machine tool builder. The MTB identification information on the diagnosis accepting server of the machine remote diagnosis package can be set to accept diagnosis requests only from the machines manufactured by the machine tool builder. (Example of specification format: "FANUC")
MACHINE ID	Information required by the machine remote diagnosis package to identify the machine under diagnosis (Example of specification format: "217xxx-1011xxxxx")

MACHINE REMOTE DIAG screen (INQUIRY1, INQUIRY2, INQUIRY3)

Press soft key [REMOTE DIAG] to display the MACHINE REMOTE DIAG screen.

By using page keys [PAGE ⇧] [PAGE ⇩], the three host computers at inquiry destinations 1, 2, and 3 can be set.





MACHINE REMOTE DIAG screens (INQUIRY1):
Screen when the DNS function is disabled (left) and screen when the function is enabled (right)

Setting item

Item	Description
HOST NAME	Specify the IP address of the host computer (machine remote diagnosis accepting server) when the DNS function is disabled. (Example of specification format: "200.201.202.203") Specify the host name of the host computer (machine remote diagnosis accepting server) when the DNS function is enabled. (You can specify up to 63 characters.) (Example of specification format: "RMTDIAG.FANUC.CO.JP")
PORT NUMBER	Specify a port number. Usually, specify "8194" because the machine remote diagnosis functions are used.
INQUIRY NAME	Specify information for identifying the host computer (machine remote diagnosis accepting server). (You can specify up to 63 characters.) (Example of specification format: "FANUC LTD.")

5.2 RELATED NC PARAMETERS

0024	Setting of communication with the PMC ladder development tool

[Input type] Setting input
[Data type] Byte
[Valid data range] 10: The high-speed interface (Ethernet) is used for PMC online editing.

	#7	#6	#5	#4	#3	#2	#1	#0
0905							PCH	

[Input type] Parameter input
[Data type] Bit

#1 PCH At the start of communication of the Data Server, FTP file transfer function, or machine remote diagnosis functions, checking for the presence of the server using PING is:
0: Performed.
1: Not performed.

NOTE
Usually, set Performed (0).
When the presence of the server using PING is not checked by setting 1, it may take several tens of seconds until an error is recognized due to no server on the network.
For mainly security reasons, a personal computer may be set so that it does not respond to the PING command. Set 1 when the Data Server communicates with such a personal computer.

	#7	#6	#5	#4	#3	#2	#1	#0
8706		MRD						

[Input type] Parameter input
[Data type] Bit

#6 MRD Type of communication device to be used by the machine remote diagnosis function:
0: The machine remote diagnosis function is not used.
1: The Fast Ethernet board is used.

NOTE
When this parameter is set, the power must be turned off before operation is continued.

5.3 CONTROLLING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS FROM THE PMC

You can use signals from the PMC to control the start and forced termination of the machine remote diagnosis functions and post the status of the machine remote diagnosis functions and error numbers to the PMC ladder.

⚠ WARNING
Before controlling the machine remote diagnosis functions from the PMC, fully understand the instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual.
If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

5.3.1 Signals

No.	#7	#6	#5	#4	#3	#2	#1	#0
G0141			DIAREQ	DIASTP		INQU2	INQU1	INQU0

DIAREQ <G0141.5>
[Name] Signal to request machine remote diagnosis
[Classification] Input signal
[Function] Requests the start of machine remote diagnosis.

[Operation] When this signal is set to "1", it requests the start of machine remote diagnosis to the inquiry destination according to the signals indicating the number of the inquiry destination (INQU0 to INQU2). When the acceptance completion signal (RMTEND) or acceptance reject signal (RMTCAN) is set to "1", this signal is set to "0".

DIASTP <G0141.4>
[Name] Signal to request machine remote diagnosis cancellation
[Classification] Input signal
[Function] Requests the forced termination of machine remote diagnosis.
[Operation] When this signal is set to "1", it requests forced termination to the machine remote diagnosis accepting server. When the completion signal for machine remote signal cancel acceptance (RMTCLS) is set to "1", this signal is set to "0".

INQU2 <G0141.2>
INQU1 <G0141.1>
INQU0 <G0141.0>
[Name] Inquiry number select signals
[Classification] Input signal
[Function] Inquiry destination for which to start machine remote diagnosis
[Operation] Select an item from the table below as an inquiry destination for which to start machine remote signal.

INQU2	INQU1	INQU0	Status
0	0	0	No selection
0	0	1	Inquiry destination 1
0	1	0	Inquiry destination 2
0	1	1	Inquiry destination 3

No.	#7	#6	#5	#4	#3	#2	#1	#0
F0082					RMTCLS			

RMTCLS <F0082.3>
[Name] Completion signal for machine remote diagnosis cancel acceptance
[Classification] Output signal
[Function] Notifies that a request to cancel machine remote diagnosis has been accepted.
[Output condition] When machine remote diagnosis is canceled after the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", this signal is set to "1". When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", this signal is set to "0".

No.	#7	#6	#5	#4	#3	#2	#1	#0
F0083	RMTCAN	RMTEND	DIAST5	DIAST4	DIAST3	DIAST2	DIAST1	DIAST0

RMTCAN <F0083.7>
[Name] Reject signal for machine remote diagnosis acceptance
[Classification] Output signal
[Function] Notifies that a machine remote diagnosis request has been rejected.
[Output condition] When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server rejects the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".

RMTEND <F0083.6>
[Name] Completion signal for machine remote diagnosis acceptance
[Classification] Output signal

[Function] Notifies that a machine remote diagnosis request has been accepted by the machine remote diagnosis accepting server.
[Output condition] When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server accepts the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".

DIAST5 <F0083.5>
DIAST4 <F0083.4>
DIAST3 <F0083.3>
DIAST2 <F0083.2>
DIAST1 <F0083.1>
DIAST0 <F0083.0>
[Name] Notification signals for the machine remote diagnosis status
[Classification] Output signal
[Function] Report the status of machine remote diagnosis.
[Output condition] The status of machine remote diagnosis is reported as listed in the following table.

DIAST5	DIAST4	DIAST3	DIAST2	DIAST1	DIAST0	Description
0	0	0	0	0	0	No status
0	0	0	0	0	1	OPEN
0	0	0	0	1	0	OPENING
0	0	0	0	1	1	ACCEPTED
0	0	0	1	0	0	REFUSED
0	0	0	1	0	1	DIAGNOSING
0	0	0	1	1	0	DIAGNOSING
0	0	0	1	1	1	CLOSE
0	0	1	0	0	0	FORCE CLOSING
0	0	1	0	0	1	ERROR

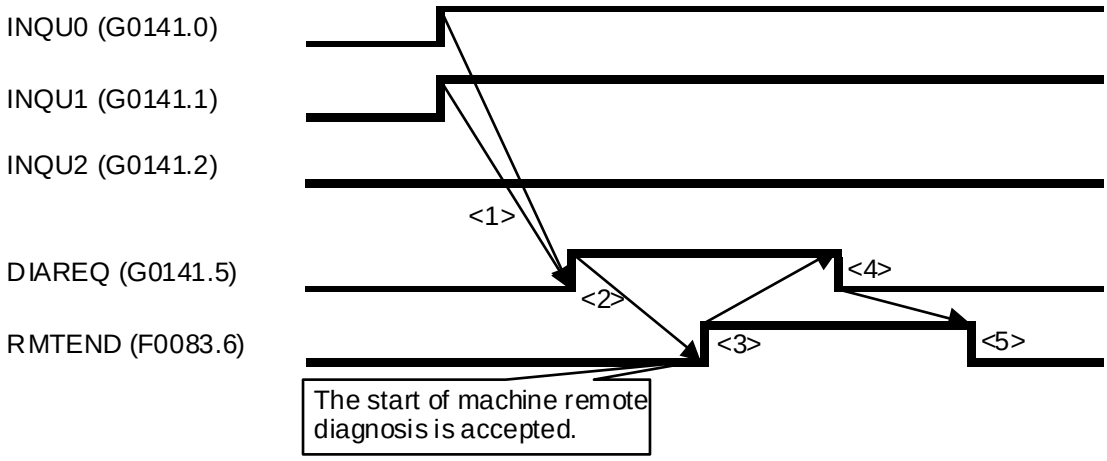
No.	#7	#6	#5	#4	#3	#2	#1	#0
F0088	DIAER7	DIAER6	DIAER5	DIAER4	DIAER3	DIAER2	DIAER1	DIAER0

DIAER7 <F0088.7>
DIAER6 <F0088.6>
DIAER5 <F0088.5>
DIAER4 <F0088.4>
DIAER3 <F0088.3>
DIAER2 <F0088.2>
DIAER1 <F0088.1>
DIAER0 <F0088.0>
[Name] Notification signals for a machine remote diagnosis error number
[Classification] Output signal
[Function] Report an error number of machine remote diagnosis.
[Output condition] These signals indicate an error number of machine remote diagnosis. The error number is 0 to 255 in binary format.

5.3.2 Signal Timing Charts

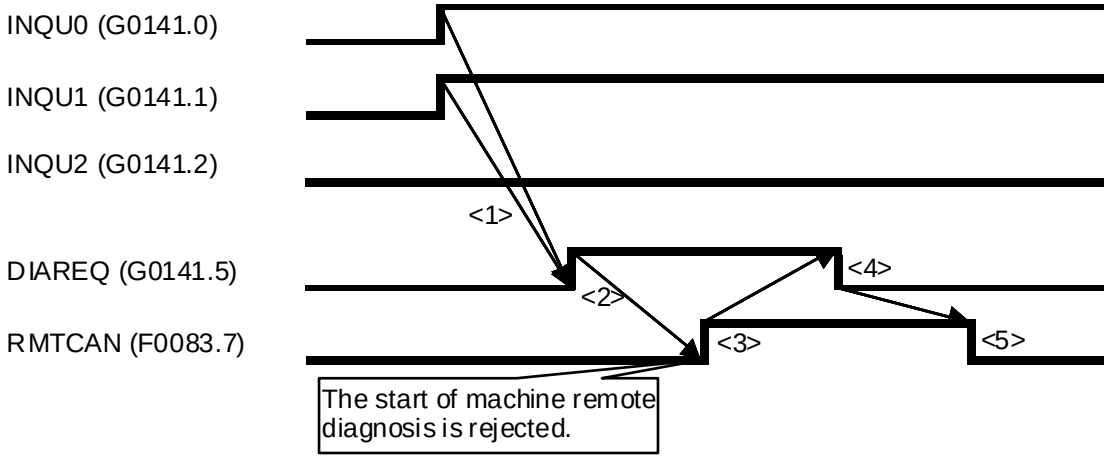
This section describes control of the start and forced termination of machine remote diagnosis according to the signals from the PMC using timing charts.

5.3.2.1 When the start of machine remote diagnosis is accepted



<1> Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.
<2> The signal to request machine remote diagnosis (DIAREQ) is set to "1".
<3> When the machine remote diagnosis package accepts the request to start diagnosis, the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1".
<4> When the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".
<5> When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "0".

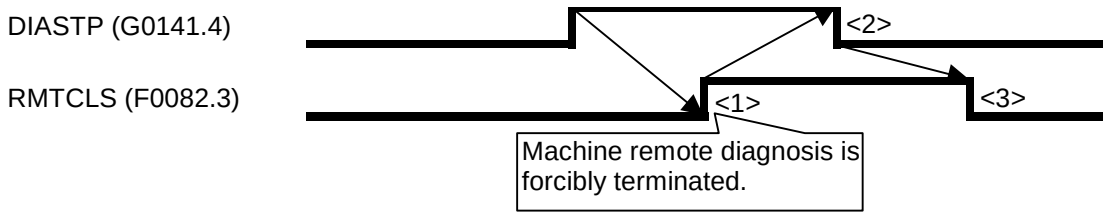
5.3.2.2 When the start of machine remote diagnosis is rejected



<1> Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.
<2> The signal to request machine remote diagnosis (DIAREQ) is set to "1".
<3> When the machine remote diagnosis package rejects the request to start diagnosis, the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1".
<4> When the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".

<5> When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "0".

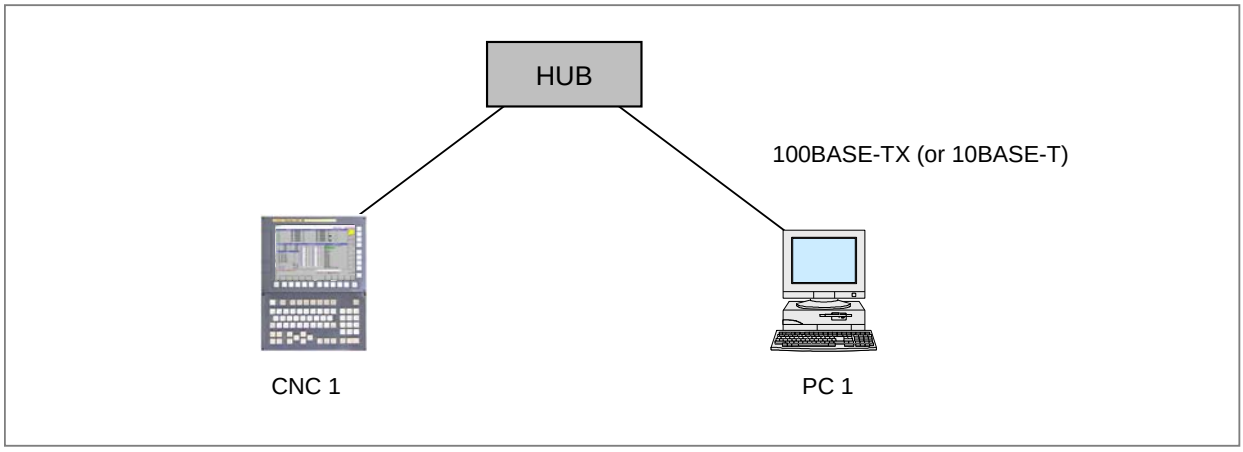
5.3.2.3 When machine remote diagnosis is forcibly terminated



<1> When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", the machine remote diagnosis functions are forcibly terminated. When the forcibly terminating is completed, the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1".
<2> When the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1", the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0".
<3> When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "0".

5.4 EXAMPLE OF SETTING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

An example of setting for operating the machine remote diagnosis functions is given below. In this example of setting, one personal computer functions as the machine remote diagnosis accepting server and machine remote diagnosis client and is connected to one CNC.



	CNC 1
IP ADDRESS	192.168.0.100
SUBNET MASK	255.255.255.0
ROUTER IP ADDRESS	None
PORT NUMBER (TCP)	8193
PORT NUMBER (UDP)	0
TIME INTERVAL	0
MTB ID	FANUC
MACHINE ID	217XXX-101XXXXX
INQUIRY 1 : HOST NAME	192.168.0.200
INQUIRY 1 : PORT NUMBER	8194

The common setting screen is used for setting.

The FOCAS2 setting screen is used for setting.

The machine remote diagnosis screen is used for setting.

	PC 1
IP address	192.168.0.200
Sub-net mask	255.255.255.0
Default gateway	None
Accepting server : PORT NUMBER	8194
Proxy server : PORT NUMBER	8193
MTB ID	Accepts all diagnosis requests.

"Microsoft TCP/IP property" of the personal computer (Windows) is used for setting.

"Diagnosis accepting server setting" of the machine remote diagnosis package is used for setting.

6 SETTING THE UNSOLICITED MESSAGING FUNCTION

This chapter describes the setting of parameters for the Unsolicited Messaging function.

6.1 SETTING THE UNSOLICITED MESSAGING FUNCTION

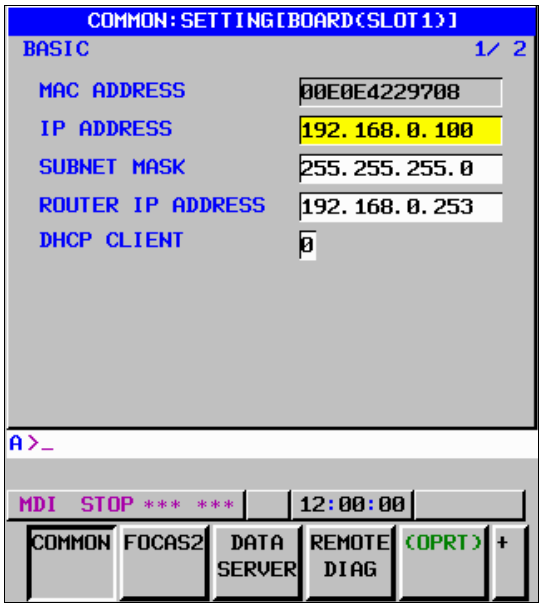
This section describes the setting screen for operating the Unsolicited Messaging function.

Procedure

1 Press the function key SYSTEM.
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)
3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4 Press soft keys [COMMON], [FOCAS2], and [UNSOLI MSG] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet/Fast Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")

Item	Description
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")
DHCP CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit6 (DHC) of parameter No.904 related to the DHCP client function is displayed, and the setting is also possible. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

Display item

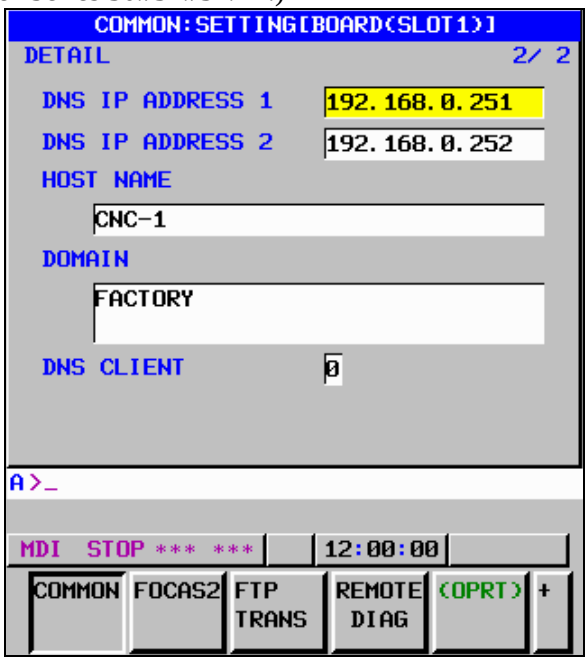
Item	Description
MAC ADDRESS	Fast Ethernet/Fast Data Server MAC address

NOTE

The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

COMMON screen (DETAIL)

Press soft key [COMMON] then page keys [PAGE ⇧] [PAGE ⇩] to display the COMMON screen (DETAIL). Set the setting items for DNS IP addresses.
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DNS CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (DETAIL)

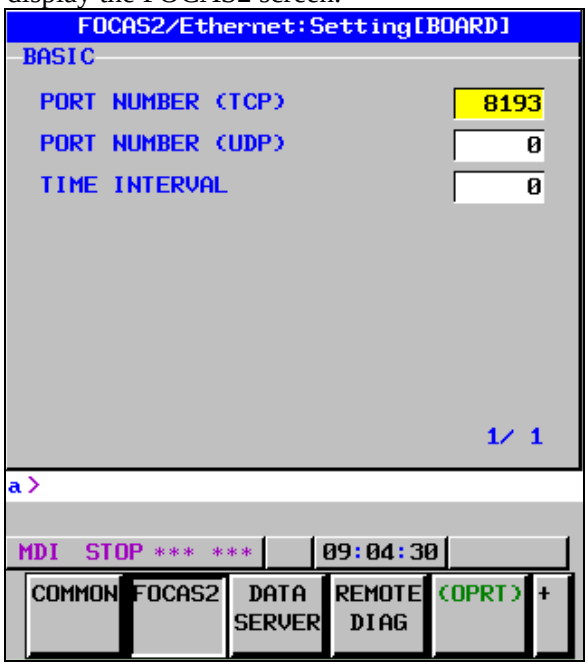
Setting item

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.

Item	Description
DNS CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit5 (DNS) of parameter No.904 related to the DNS client function is displayed, and the setting is also possible. See "RELATED NC PARAMETERS", which will be seen later.

FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.



FOCAS2 screen

Setting item

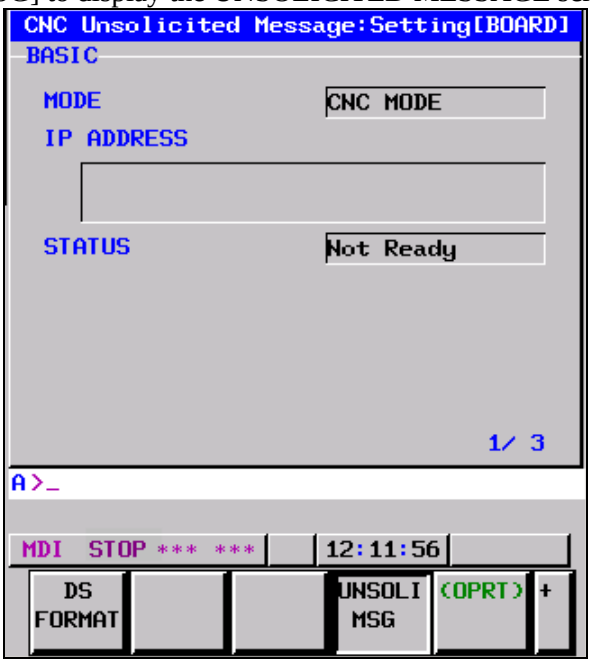
Item	Description
PORT NUMBER (TCP)	Specifies the port No. to be used by the Unsolicited Messaging function (FOCAS2/Ethernet function), within a range of 5001 to 65535.
PORT NUMBER (UDP)	Set 0.
TIME INTERVAL	Set 0.

6.1.1 Selection of Mode

This Subsection describes how to select the mode for setting the Unsolicited Messaging function.

UNSOLICITED MESSAGE screen (BASIC)

Press soft key [UNSOLI MSG] to display the UNSOLICITED MESSAGE screen (BASIC).



UNSOLICITED MESSAGE screen1 (Basic)

Setting item

Item	Description
MODE	Select the mode for setting the Unsolicited Messaging function. Refer to the next Operation for the setting method. For “CNC MODE”: This mode is for the setting by the CNC screen. In this case, the setting by the personal computer is impossible. Refer to Subsection 6.1.2, “Setting method by CNC screen” for details. For “PC MODE”: This mode is for the setting by the personal computer. In this case, the setting by the CNC screen is impossible. Refer to Subsection 6.1.3, “Setting method by personal computer” for details.

NOTE

1 When you use this function for the first time, the mode is “PC MODE”.
2 The change of mode is possible under only the state “Not Ready”. Refer to the next Display item for the state “Not Ready”.
3 When you change from “CNC MODE” to “PC MODE”, all setting parameters of the Unsolicited Messaging function are cleared.

Operation

The mode can be changed.

1 Press soft key [(OPRT)] to display soft key [MODE].

2 Press soft key [MODE] to display soft keys [CNC MODE] and [PC MODE].

3 Press soft key of the mode that you want to change.

Display item

Item	Description
IP ADDRESS	The IP address of the connecting personal computer as a Unsolicited Messaging Server is displayed. (Example of specification format: "192.168.0.1")
STATUS	The Current status is displayed. The kind of status is the following five states. [1] Not Ready The state that data are not transmitted even if there is a data transmission request by NC program or Ladder program. [2] Ready The state that data are transmitted by a data transmission request by NC program or Ladder program. [3] Sending… The state from acceptance of the request until completion of data transmission. [4] Receiving… The state from completion of data transmission until receiving the response data. [5] Completed The state from receiving the response data until completion of receiving operation. <Complement> - The data transmission: This means that the Unsolicited Message is transferred from the CNC to the personal computer. - The response data: This means that the response of Unsolicited Message is transferred from the personal computer to the CNC.

NOTE
1 Execute the FOCAS2 function “cnc_unsolicstart” from the personal computer to change the status from “Not Ready” to “Ready”.
2 Execute the FOCAS2 function “cnc_unsolicstop” from the personal computer to change the status from except for “Not Ready” to “Not Ready”.
3 Refer to Section 6.2, “EXECUTING THE UNSOLICITED MESSAGING FUNCTION” for timing charts of status.

6.1.2 Setting Method by CNC Screen

This section describes how to set the parameters by the UNSOLICITED MESSAGE screen.

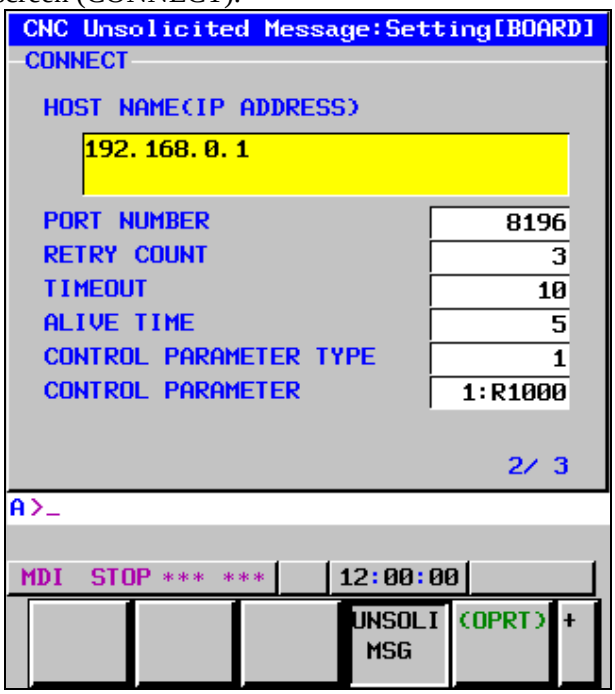
NOTE
1 Operate the following procedures in order to enable the parameters and start the Unsolicited Message transmission.
(1) Set all setting items of the UNSOLICITED MESSAGE screen (CONNECT).
(2) Press soft key [(OPRT)] → [APPLY].
(3) Execute FOCAS2 function “cnc_unsolicstart” to start Unsolicited Messaging from the personal computer.

NOTE

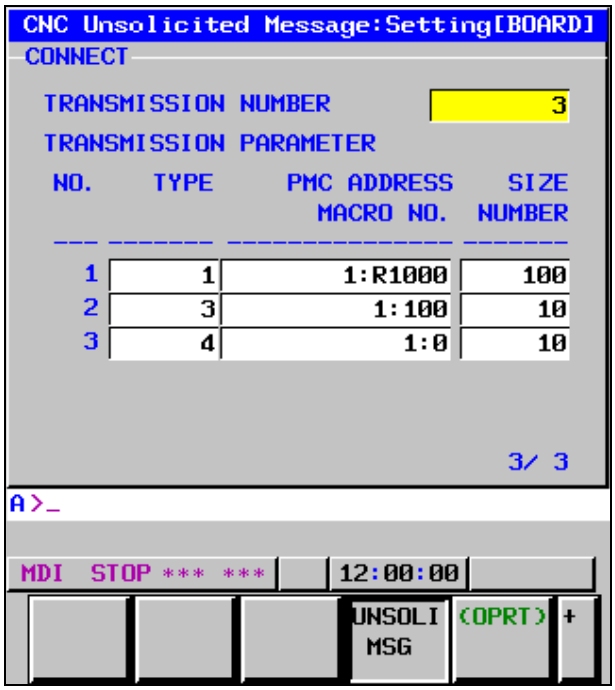
2 The input to Setting item and the execution of soft key [(OPRT)] → [APPLY] in the UNSOLICITED MESSAGE screen (CONNECT) are possible under only the state “Not Ready”. Refer to Display item of Subsection 6.1.1, “Selection of mode” for the status “Not Ready”.

UNSOLICITED MESSAGE screen (CONNECT)

Press soft key [UNSOLI MSG] and page keys [PAGE ⇧] [PAGE ⇩] to display the UNSOLICITED MESSAGE screen (CONNECT).



UNSOLICITED MESSAGE screen 2 (CONNECT)



UNSOLICITED MESSAGE screen 3 (CONNECT)

Setting item

Item	Description
HOST NAME (IP ADDRESS)	Specify the IP address of the host computer when the DNS function is disabled. (Example of specification format: "192.168.0.1") Specify the host name of the host computer when the DNS function is enabled. (You can specify up to 63 characters.) (Example of specification format: "UNSOLI-SRV.FACTORY")
PORT NUMBER	Specify a TCP port number and a UDP port number. Usually, specify "8196". Input range: 5001 to 65535
RETRY COUNT	Specify the retry count when the server does not respond to the client message. Input range: 0 to 32767
TIMEOUT	Specify the timeout (second) for the response of the transmitted data. Input range: 1 to 32767
ALIVE TIME	Specify the time interval (in seconds) at which to send the alive signal during normal operation. Specify the value that is less than TIMEOUT. Input range: 1 to 32767

Item	Description
CONTROL PARAMETER TYPE	Specify the type of the control parameter. The control parameter is not effective when this parameter is “0”. - “1”: PMC address (Response Notice method) - “2”: PMC address (Simple method) - “3”: Custom macro variables (Simple method) - “4”: Volatile RTM variables (Simple method)
CONTROL PARAMETER	Specify the control parameter to execute the data transmission.
	In case of CONTROL PARAMETER TYPE “1”:
	Specify a PMC address for control. The available PMC area is R and E. Two bytes are allowed from this PMC address.
CONTROL PARAMETER	In case of CONTROL PARAMETER TYPE “2”:
	Specify a PMC address for control. The available PMC area is R and E. One byte is allowed from this PMC address.
	In case of CONTROL PARAMETER TYPE “3”:
	Specify a custom macro variable number for control. The available custom macro variables are the volatile common variables. One variable is allowed from this variable number.
	In case of CONTROL PARAMETER TYPE “4”:
	Specify a RTM variable number for control. The available RTM variables are the volatile RTM variables. One variable is allowed from this variable number.
TRANSMISSION NUMBER	Specify a number of the transmission data. Input range: 1 to 3
TRANSMISSION PARAMETER (NO.1-3)	Specify the parameter of each transmission data.
TYPE	Specify the type of the transmission data. The transmission parameters are not effective when this parameter is “0”. - “1” or “2”: PMC address - “3”: Custom macro variables - “4”: Volatile RTM variables - “5”: Nonvolatile RTM variables
PMC ADRESS, or MACRO NO.	Specify the top of area for the transmission data.
	In case of TRANSMISSION PARAMETER TYPE “1” or “2”:
	Specify a PMC address for transmission.
	In case of TRANSMISSION PARAMETER TYPE “3”:
	Specify a custom macro variable number for transmission.
	In case of TRANSMISSION PARAMETER TYPE “4” or “5”:
	Specify a RTM variable number for transmission.
SIZE, or NUMBER	Specify a size of area or a number for the transmission data. The available maximum size is below. - For TRANSMISSION NUMBER “1”: 2890 bytes - For TRANSMISSION NUMBER “2”: 2874 bytes in total - For TRANSMISSION NUMBER “3”: 2858 bytes in total Exchange one variable for eight bytes when the macro variables (the custom macro variables or the RTM variables) are used.
	In case of TRANSMISSION PARAMETER TYPE “1” or “2”:
	Specify a size of area for the transmission data.
	In case of TRANSMISSION PARAMETER TYPE “3”:
	Specify a number of the macro variables for the transmission data. And, when the macro variable number is larger than 1000 (a system variable), specify “1” to this parameter.
	In case of TRANSMISSION PARAMETER TYPE “4” or “5”:
	Specify a number of the RTM variables for the transmission data.

⚠ WARNING

Before allocating a PMC area or macro variable for the unsolicited messaging function, fully understand the instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual.
The area of a PMC address for control cannot overlap any PMC area used for other than the unsolicited messaging function. The area of a macro variable for control cannot overlap the area.
If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ CAUTION

1 In the PMC area, the R area, and E area in volatile memory are all set to 0 immediately after power-on.
2 The E area in the PMC area is normally allocated to volatile memory. However, it can also be used as nonvolatile memory by setting the option.
When the area is used as nonvolatile memory, the contents of the area are retained even after the power is turned off. So, special attention should be paid not to cause an unpredictable operation when the power is turned on next time.

NOTE

1 In the methods to specify a PMC address for CONTROL PARAMETER TYPE, there are the Response Notice method and the Simple method. Refer to Section 6.2, “EXECUTING THE UNSOLICITED MESSAGING” for details.
2 The available range of a PMC address depends on the available PMC Memory Type.
3 The available range of a custom macro variable and a RTM variable depends on the valid option.
The RTM variable means a real-time custom macro variable.
No real-time custom macro variable can be used with the Series 35*i*-B or Power Motion *i*-A.
4 Set the number of TRANSMISSION PARAMETER (NO.1-3) to TRANSMISSION NUMBER. For example, when TRANSMISSION NUMBER is “3”, if there are one or more non-effective value in TRANSMISSION PARAMETER (NO.1-3), an error occurs by pressing soft key [APPLY].

PMC address setting

When setting a PMC address for control or transmission, specify it as follows:

```
Input format)
    <Path number>:<PMC address>
```

For example, for R0500 on the second path of the PMC, input "2:R500".
If <Path number> is omitted (R500), the first path is assumed (1:R0500).
If the <:> key is not available, it can be substituted with the </> key or the <EOB> key. ":" is optional.
To clear "<Path number>:<PMC address>" previously set, input " " (blank). ("---" will be displayed). In this case, it is assumed that no PMC area is used.

Macro variable setting

When setting a macro variable for control or transmission, specify it as follows:

```
Input format)
    <Path number>:<Variable number>
```

For example, for variable #100 on the second path of the CNC, input "2:100".
If <Path number> is omitted (100), the first path is assumed (1:100).
If the <:> key is not available, it can be substituted with the </> key or the <EOB> key. ":" is optional.
To clear "<Path number>:<Variable number>" previously set, input " " (blank). ("---" will be displayed).
In this case, it is assumed that no macro variable is used.

Operation

The all setting items in UNSOLICITED MESSAGE screen (CONNECT) become effective.

1 Press soft key [(OPRT)] to display soft key [APPLY].

2 Press soft key [APPLY].

6.1.3 Setting Method by Personal Computer

Create Application software by using the FOCAS2 functions if you set the parameters by the personal computer.

- cnc_wrunsolicprm2 Setting of the parameters for the Unsolicited Messaging (2)
- cnc_unsolicstart Start of the Unsolicited Messaging

Refer to “5. Unsolicited Messaging Function” in “FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data window library” for details

> ⚠ **WARNING**
> Before allocating a PMC area or macro variable for the unsolicited messaging function, fully understand the instructions written in “GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT” in “SAFETY PRECAUTIONS” at the beginning of this manual.
> The area of a PMC address for control cannot overlap any PMC area used for other than the unsolicited messaging function. The area of a macro variable for control cannot overlap the area.
> If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

> **NOTE**
> 1 Execute the FOCAS2 function “cnc_unsolicstart” to start the Unsolicited Message transmission after you execute the FOCAS2 function “cnc_wrunsolicprm2”.
> 2 The Execution of the FOCAS2 function “cnc_wrunsolicprm2” is possible under only the state “Not Ready”. Refer to Display item of Subsection 6.1.1, “Selection of mode” for the status “Not Ready”.
> 3 The setting values set by the personal computer are displayed in the UNSOLICITED MESSAGE screen (CONNECT) after the FOCAS2 function “cnc_wrunsolicprm2” is executed.

6.2 EXECUTING THE UNSOLICITED MESSAGING FUNCTION

This section describes how to execute the Unsolicited Messaging function.
The method to execute the Unsolicited Messaging function is the following three ways

- In case of the Response Notice method by using a PMC address for control.
- In case of the Simple method by using a PMC address for control.
- In case of the Simple method by using a macro variable for control.

NOTE

1 When the Ladder program is used, there are the Response Notice method and the Simple method. A main difference is the followings. In the former, the response RES_CODE of the data transmission is notified to the Ladder program. In the latter, the response of the data transmission isn't notified to the Ladder program.
Choose the Response Notice when you want to apply the Ladder program used by Series 16*i* etc. If it is not necessary to receive the response RES_CODE, it is easy to use the simple method.

2 RES_CODE is recorded in the LOG screen for the Fast Ethernet/Fast Data Server when "0x00" or "0x01" as RES_CODE is detected.

3 Refer to "5. Unsolicited Messaging Function" in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data window library" for the details of RES_CODE.

6.2.1 When Using a PMC Address for Control (Response Notice method)

This subsection describes how to use the Response Notice method.

NOTE

Both a PMC address as the control parameter and a macro variable as the transmission parameter can be set.
In this case, be careful not to clear which timing value to be read if the Ladder program transmits a macro variable.
The following explanation describes the case that both the control parameter and the transmission parameter are PMC addresses.

Signals of PMC address for control

This describes the details of the signals of a PMC address for control when the Unsolicited Messaging function is used. The area of a PMC address for the control is two bytes. The following indicates the case that "Rxxxx" is used as a PMC address for control. "Rxxxx" means a PMC address that the PMC path number is omitted

No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx	REQ							

REQ <Rxxxx.7>
[Name] Signal to request the message transmission
[Classification] Input signal
[Function] Requests the Unsolicited Message transmission.

[Operation] Set “1” to this signal after the Ladder program prepares the message. Then the message will be transmitted to the personal computer.

No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx+1	RES	COM	RES_CODE					

RES <Rxxxx+1.7>
[Name] Signal to notify the response of the message
[Classification] Output signal
[Function] This signal indicates that the response of the Unsolicited Message is received.
[Output condition] The response of the message is transmitted from the personal computer to the CNC (the communication board).
When the CNC (the communication board) receives the response of the message, “1” is set to this signal. When “1” is set to this signal, the Ladder program reads out the response code (RES_CODE) and sets “0” to the signal REQ. Then the CNC (the communication board) will clear RES_CODE and this signal.

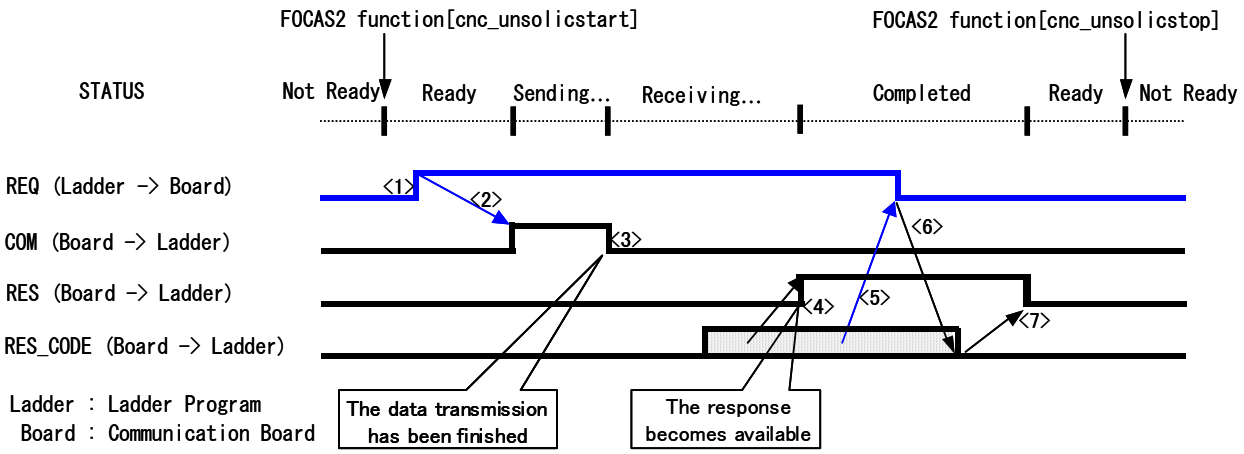
COM <Rxxxx+1.6>
[Name] Signal to notify the start of the message transmission
[Classification] Output signal
[Function] This signal indicates that the Unsolicited Message transmission is starting.
[Output condition] When the message transmission to the personal computer is started, “1” is set to this signal. When the message transmission is completed, “0” is set to this signal.

RES_CODE <Rxxxx+1.0> to <Rxxxx+1.5>
[Name] Indicates the response code of the message
[Classification] Output signal
[Function] This code indicates the response code of the Unsolicited Message.
[Output condition] The response code of the message is set. The Ladder program sets “0” to the signal REQ after reading out this code. Then this code will be cleared by CNC (the communication board).

NOTE
Refer to “5. Unsolicited Messaging Function” in “FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data window library” for the details of RES_CODE.

Timing charts of PMC address for control

This describes the timing charts of the signals of a PMC address for control when using the Response Notice method.
The following example indicates the case that the Unsolicited Message is transmitted only once after the FOCAS2 function “cnc_unsolicstart” was received, and FOCAS2 function “cnc_unsolicstop” is received.



<1> The Ladder program prepares the message and sets “1” to the signal REQ after its program confirms that the signal RES has been “0”.
<2> The communication board sets “1” to the COM signal because “1” is set to the signal REQ, and the message transmission is started.
<3> The communication board sets “0” to the signal COM when the message transmission is completed.
<4> The communication board sets the RES_CODE and sets “1” to the signal RES when the response of the message is received.
<5> The Ladder program sets “0” to the signal REQ after its program read out the RES_CODE and the RES signal is “1”.
<6> The communication board clears the RES_CODE because “0” is set to the signal REQ.
<7> The communication board sets “0” to the signal RES.

NOTE
Refer to Display item in Subsection 6.1.1, “Selection of mode” for the details of STATUS.

6.2.2 When Using a PMC Address for Control (Simple Method)

This subsection describes how to use the Simple method by a PMC address for control.

NOTE
Both a PMC address as the control parameter and a macro variable as the transmission parameter can be set.
In this case, be careful not to clear which timing value to be read if the Ladder program transmits a macro variable.
The following explanation describes the case that both the control parameter and the transmission parameter are PMC addresses.

Signals of PMC address for control

This describes the details of the signals of a PMC address for control to execute the Unsolicited Messaging function. The area of a PMC address for the control is one byte. The following indicates the case that “Rxxxx” is used as a PMC address for control. “Rxxxx” means a PMC address that the PMC path number is omitted

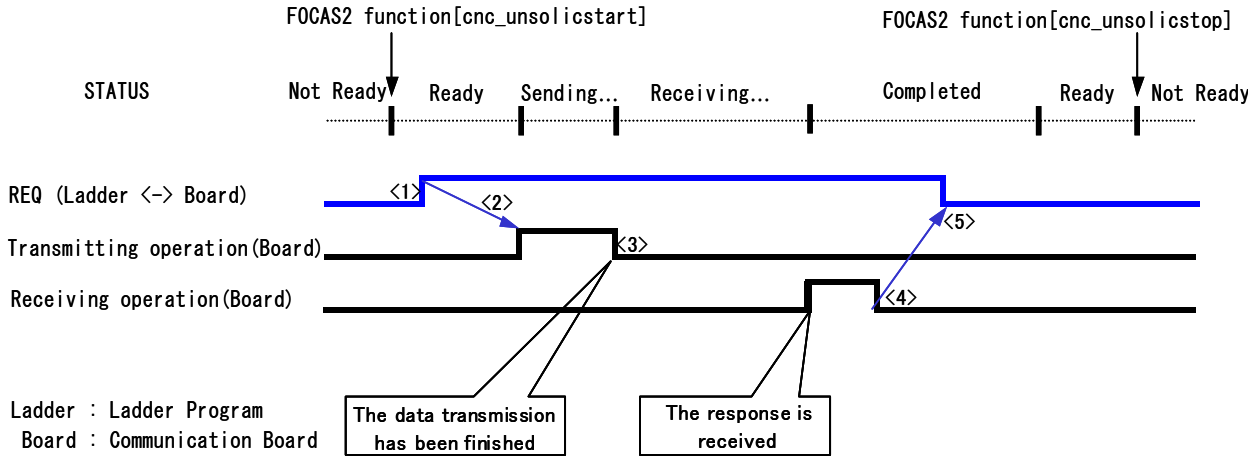
No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx	REQ							

REQ <Rxxxx.7>
[Name] Signal to request the message transmission

[Classification] Input signal/Output signal
[Function] Requests the Unsolicited Message transmission.
[Operation] Set “1” to this signal after the Ladder program prepare the message. Then the message will be transmitted to the personal computer. When the response of the message is received, this signal is cleared by CNC (the communication board).

Timing charts of PMC address for control

This describes the timing charts of the signals of a PMC address for control when using the Simple method.
The following example indicates the case that the Unsolicited Message is transmitted only once after the FOCAS2 function “cnc_unsolicstart” was received, and FOCAS2 function “cnc_unsolicstop” is received.



<1> The Ladder program prepares the message and sets “1” to the signal REQ after its program confirms that the signal REQ has been “0”.
<2> The communication board transmits the message because “1” is set to the signal REQ.
<3> The transmitting operation of the communication board is completed.
<4> The receiving operation of the communication board is completed after the response of the message is received.
<5> The communication board sets “0” to the signal REQ after the receiving operation is completed.

NOTE
1 The REQ signal is also set to “0” when transmission terminates abnormally. When it is necessary to check the transmission result, use the Response Notice method described in Subsection 6.2.1.
2 Refer to Display item in Subsection 6.1.1, “Selection of mode” for the details of STATUS.

6.2.3 When Using a Macro Variable for Control (Simple Method)

This subsection describes how to use the Simple method by a macro variable for control.
The way to use a custom macro variable and a RTM variable in the macro variables for control is the same.

NOTE

Both a macro variable as the control parameter and a PMC address as the transmission parameter can be set.
In this case, be careful not to clear which timing value to be read if the NC program transmits a PMC data.
The following explanation describes the case that both the control parameter and the transmission parameter are macro variables.

Macro Variables for control

This describes the details of the macro variable for control to execute the Unsolicited Messaging function. The area of the macro variable for control is one variable. The following indicates the case that "#xxxx" is used as a macro variable for control. "#xxxx" means a macro variable that the CNC path number is omitted

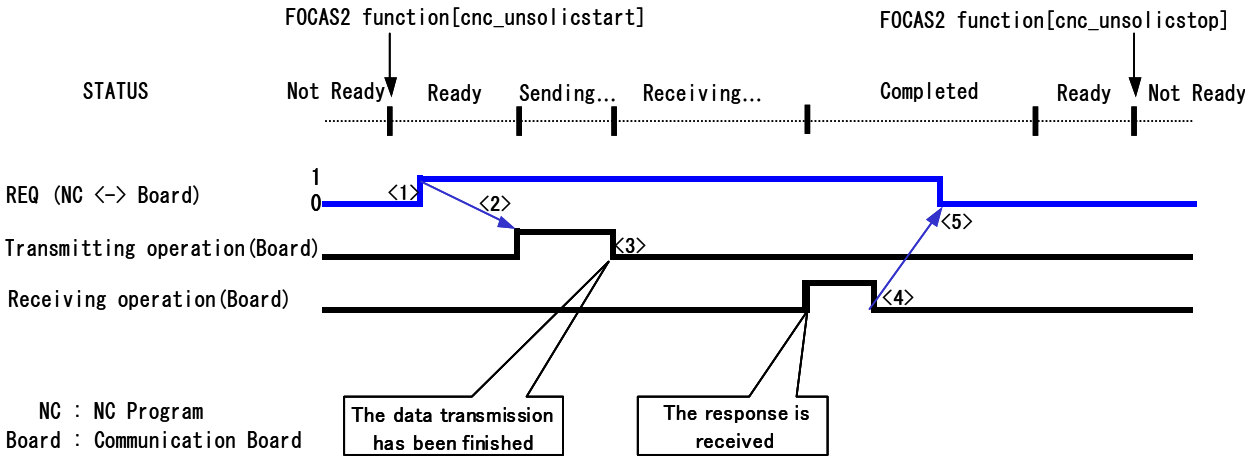
REQ <#xxxx>
[Name] Variable to request the message transmission
[Classification] Input variable/Output variable
[Function] Requests the Unsolicited Message transmission.
[Operation] Set "1" to this variable after the NC program prepare the message. Then the message will be transmitted to the personal computer. When the response of the message received, this variable is cleared by CNC (the communication board).

NOTE

The input and output value in the variable REQ is a real number. Therefore "0" and "1" indicate "0.0" and "1.0".

Timing charts of macro variables for control

This describes the timing charts of the macro variable for control when using the Simple method.
The following example indicates the case that the Unsolicited Message is transmitted only once after the FOCAS2 function "cnc_unsolicstart" was received, and FOCAS2 function "cnc_unsolicstop" is received.



<1> The NC program prepares the message and sets "1" to the variable REQ after its program confirms that the variable REQ has been "0".
<2> The communication board transmits the message because "1" is set to the variable REQ.
<3> The transmitting operation of the communication board is completed.

<4> The receiving operation of the communication board is completed after the response of the message is received.
<5> The communication board sets “0” to the variable REQ after the receiving operation is completed.

NOTE
1 The REQ signal is also set to “0” when transmission terminates abnormally. When it is necessary to check the transmission result, use the Response Notice method described in Subsection 6.2.1.
2 Refer to **Display item** in Subsection 6.1.1, “Selection of mode” for the details of STATUS.

Example to use macro variables for control

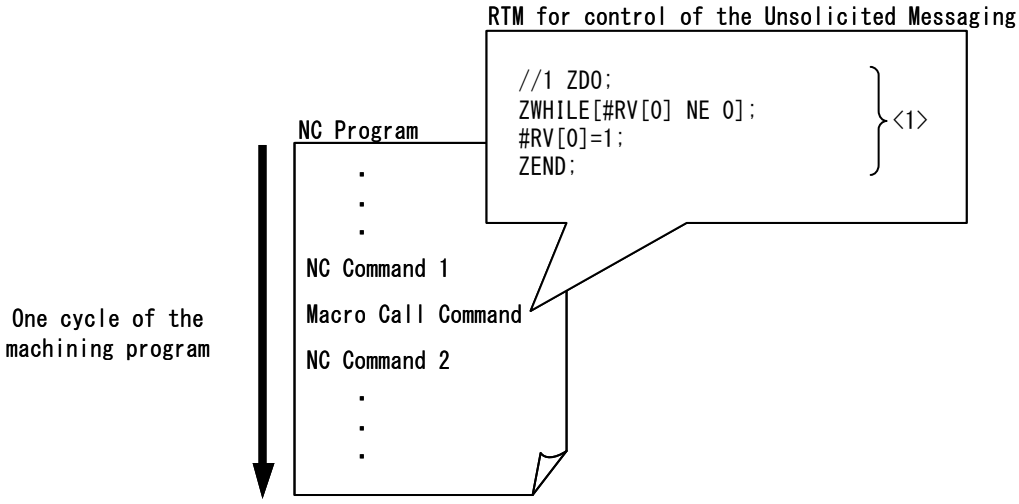
This describes the example to use the macro variable for control.

- Example
  [Contents]
  In the NC program of the CNC path number “1”, the way to transmit the date and time by using macro variables is explained.

  [Setting]
  The volatile RTM variable number #0 (REQ) is used as the macro variable for control. And, the date and time (the system variable number #3011, #3012) managed in the CNC are used as the macro variable for transmission.

Setting item		Setting value
CONTROL PARAMETER TYPE		4
CONTROL PARAMETER		1:0
TRANSMISSION NUMBER		2
TRANSMISSION PARAMETER (NO.1)		
	TYPE	3
	MACRO NO.	1:3011
	NUMBER	1
TRANSMISSION PARAMETER (NO.2)		
	TYPE	3
	MACRO NO.	1:3012
	NUMBER	1

[Example of the NC program]
The RTM executes the next NC command of the RTM at the same time. At this time, the RTM doesn't influence the operation timing of the next NC command of the RTM.
Therefore, the date and time when the NC command 2 is executed is notified.



(Reference) <1> in the example corresponds to <1> in the timing charts above.

> **NOTE**
> If a custom macro variable is used as the macro variable for control, be careful to influence the operation timing of the NC command. For example, if the RTM for control of the above example is replaced to a custom macro, the NC command 2 isn't executed unless the macro variable for control changes. Refer to OPERATOR'S MANUAL (Common to Lathe System/Machining Center System) for the details of a custom macro and a RTM.

6.3 RELATED NC PARAMETERS

	#7	#6	#5	#4	#3	#2	#1	#0
0904		DHC	DNS	UNM				

[Input type] Parameter input
[Data type] Bit

#4 UNM The CNC Unsolicited Messaging function is:
0: Not used.
1: Used.

> **NOTE**
> When at least one of these parameters is set, the power must be turned off before operation is continued.

	#7	#6	#5	#4	#3	#2	#1	#0
0905				UNS				

[Input type] Parameter input
[Data type] Bit

#4 UNS In the Unsolicited Messaging function, when the stop request of the Unsolicited Messaging function is received excluding the connecting Unsolicited Messaging server:
0: The stop request is rejected.
1: The stop request is accepted.

7 SETTING THE FTP FILE TRANSFER FUNCTION

This chapter describes the setting of parameters for the FTP File Transfer function.

Notes on using the FTP File Transfer function

⚠ **WARNING**

To input or output data, the use of the ISO code input/output function is recommended.
Parity information is not contained with data input/output using the ASCII code. So, the use of the ASCII code is dangerous since any data corrupted during input/output operation with the CNC is not detected.
If data corruption occurs, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.
For details of the ISO code input/output function, see Section 2.8, "ISO CODE INPUT/OUTPUT FUNCTION" in Part II, “SPECIFICATION”.
With the Series 30*i*/31*i*/32*i*-A, the ISO code input/output function cannot be used.

⚠ **CAUTION**

Before performing FTP communication using the Fast Ethernet for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network.
Be very careful about any communication failure. If the Ethernet is used on a network involved with a communication failure, a communication failure intermittently occurs in the Ethernet, which may cause a CNC system error.

NOTE

1 With the FTP File Transfer function (FTP client), a single CNC can connect only one FTP server.
2 The FTP File Transfer function of Series 30*i*/31*i*/32*i*-A do not support passive mode (PASV command).
3 When many files are registered in the host computer, it may take time to display a file list on the HOST FILE LIST screen.
In this case, take action, such as dividing the directory containing registered files.
4 When the Data Server function option (S737) is valid, the FTP File Transfer function is unavailable.
Use the Data Server functions.

7.1 SETTING THE FTP FILE TRANSFER FUNCTION

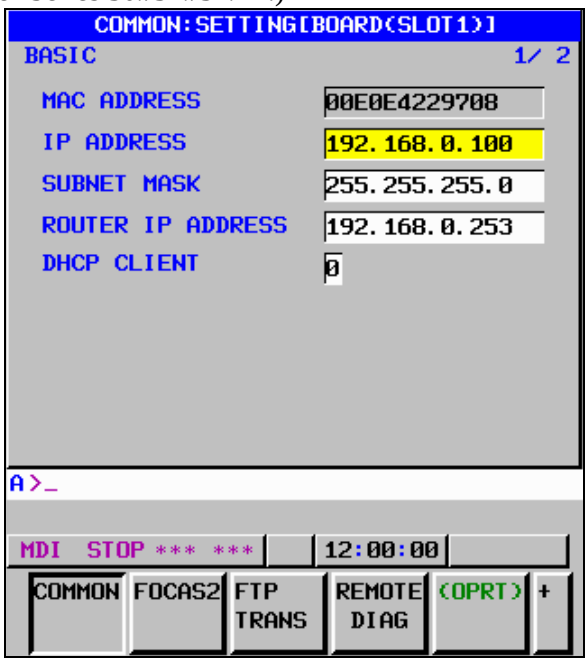
This section describes the setting screen for operating the FTP File Transfer function.

Procedure

1 Press the function key .
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, or Series 0*i*-F) appears. (When there is no soft keys, press the continue key.)
3 Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4 Press soft keys [COMMON] and [FTP TRANS] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).
(This is a screen for Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F. The setting item “DHCP CLIENT” is not displayed for Series 30*i*/31*i*/32*i*-A.)



COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")
DHCP CLIENT (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	The value of bit6 (DHC) of parameter No.904 related to the DHCP client function is displayed, and the setting is also possible. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

Display item

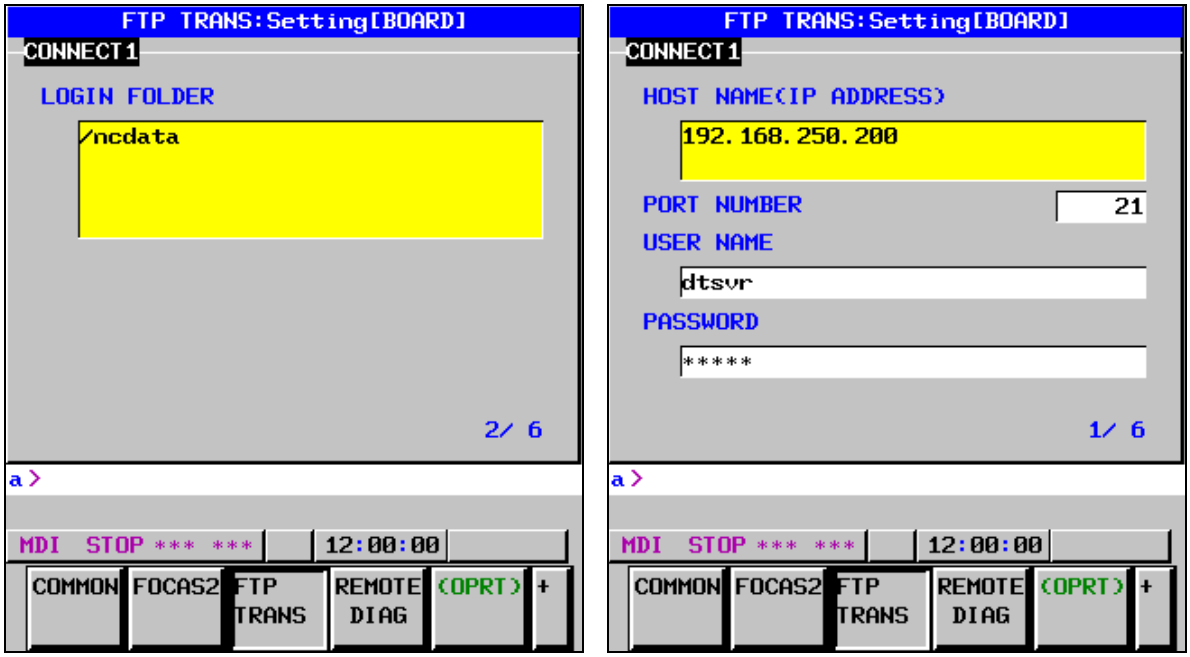
Item	Description
MAC ADDRESS	Fast Ethernet MAC address

> **NOTE**
> The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION".

FTP Trans screens (CONNECT1, CONNECT2, CONNECT3)

Press soft key [FTP TRANS] to display the FTP Trans screen.

By using page keys [PAGE ⇧] [PAGE ⇩], the three host computers at connection destinations 1, 2, and 3 can be set.



FTP Trans screens (for connection destination 1)

Setting item

Item	Description
HOST NAME	Specify the IP address of the host computer. (Example of specification format: "192.168.0.200")
PORT NUMBER	Specify the port number. Usually, set 21 because the FTP communication is used.
USER NAME	Specify the name of the user to log on to the host computer using FTP. (A user name of up to 31 characters can be specified.) Be sure to set the user name.
PASSWORD	Specify the password for the above user name. The password must always be specified.
LOGIN FOLDER	Specify a work folder to be used when the user logs in to the host computer. (Up to 127 characters can be specified.) If no data is set, the home folder set on the host computer is used as a login folder.

Operation

Select a connection destination.

1 Press soft key [(OPRT)] to display soft key [HOST SELECT]. Then, press soft key [HOST SELECT] to display soft keys [CONECT 1], [CONECT 2], and [CONECT 3].

2 Press one of soft keys [CONECT 1], [CONECT 2], and [CONECT 3] according to the host computer to which you want to make a connection. The screen title of connection destination 1, 2 or 3 is displayed in reverse video. The screen title displayed in reverse video indicates the connection destination host computer.

When connection destination 1 is selected

7.2 RELATED NC PARAMETERS

The NC parameters related to the FTP File Transfer function are described below.

0020	I/O CHANNEL : Input/output device selection

[Input type] Setting input
[Data type] Byte
[Valid data range] 5 : Selects the FTP File transfer function as the input/output device.

	#7	#6	#5	#4	#3	#2	#1	#0
0901							EFT	

[Input type] Parameter input
[Data type] Bit

#1 EFT The FTP file transfer function by the Fast Ethernet board is:
0: Not used.
1: Used.

> **NOTE**
> 1 When this parameter is set, the power must be turned off before operation is continued.
> 2 This parameter is valid only for Path 1.
> 3 If Data Server function option (S737) is valid, FTP File Transfer function cannot be used.

	#7	#6	#5	#4	#3	#2	#1	#0
0905							PCH	

[Input type] Parameter input
[Data type] Bit

#1 PCH At the start of communication of the Data Server, FTP file transfer function, or machine remote diagnosis functions, checking for the presence of the server using PING is:
0: Performed.
1: Not performed.

> **NOTE**
> Usually, set Performed (0).
> When the presence of the server using PING is not checked by setting 1, it may take several tens of seconds until an error is recognized due to no server on the network.
> For mainly security reasons, a personal computer may be set so that it does not respond to the PING command. Set 1 when the Data Server communicates with such a personal computer.

	#7	#6	#5	#4	#3	#2	#1	#0
0906					PSV			

[Input type] Parameter input
[Data type] Bit

#3 PSV The FTP clients of the Data Server functions or FTP file transfer function operate in:
0: Active mode.
1: Passive mode.

> **NOTE**
> 1 When this parameter is set, the power must be turned off before operation is continued.
> 2 This parameter is only available with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A and Series 0*i*-F.

	#7	#6	#5	#4	#3	#2	#1	#0
0908								ISO

[Input type] Setting input
[Data type] Bit

#0 ISO When the FTP File transfer function is selected as an I/O device, data input/output is performed using
0: ASCII codes.
1: ISO codes.

> **NOTE**
> This parameter is only available with the Series 30*i*/31*i*/32*i*/35*i*–B, Power Motion *i*-A and Series 0*i*-F.

	#7	#6	#5	#4	#3	#2	#1	#0
0909								HDS

[Input type] Parameter input
[Data type] Bit

> **NOTE**
> When this parameter is set, the power must be turned off before operation is continued.

#0 HDS High-speed file search in the FTP TRANSFER HOST FILE LIST screen is:
0: Disabled.
1: Enabled.

> **NOTE**
> 1 File search operation differs depending on the setting of this parameter.
> - When "0" is set, a file name starting with the search string is searched for.
> - When "1" is set, file names are searched for an exact match for the search setting. If no exact match is found, a file name starting with the search string is searched for.
>
> For example, assume that files ABCD, AAA, ABC, and BBB are listed in this order and the search string is "ABC". When "0" is set, "ABCD" is found. When "1" is set, "ABC" is found.
>
> 2 When this parameter is set to "1", a file may not be able to be searched for correctly in the DETAIL ON mode, depending on the FTP server software used. In this case, perform a search in the DETAIL OFF mode.

0921	**Selects the host computer 1 OS.**
0922	**Selects the host computer 2 OS.**
0923	**Selects the host computer 3 OS.**

[Input type] Parameter input
[Data type] Word
[Valid data range] 0 to 2
0: Windows.
1: UNIX/VMS.
2: Linux.

> **NOTE**
> Some FTP server software may not depend on the OS. Therefore, the valid file list may not be displayed by the above setting.

	#7	#6	#5	#4	#3	#2	#1	#0
11374				**PCB**	**PCP**			

[Input type] Parameter input
[Data type] Bit

#3 PCP In the program folder screen, the programs are copied or moved
0: By the old method.
1: By the new method like PC.

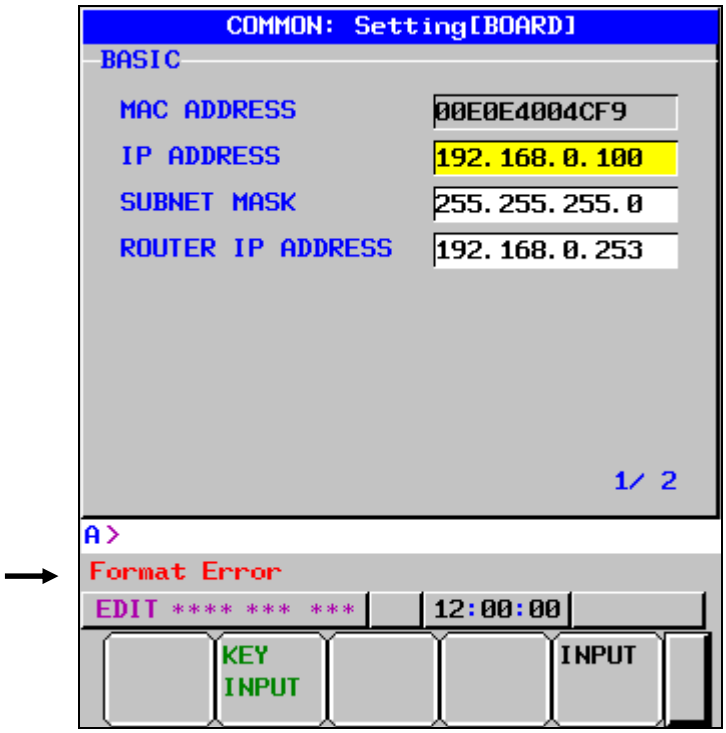
NOTE
1 This parameter is only available with the Series 30*i*/31*i*/32*i*-A.
2 To use this parameter, the machining program/execution command dual display option (R718) is required.

#4 PCB In the program folder screen, the programs are copied or moved
0: By the new method.
1: By the old method.

NOTE
This parameter is only available with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A and Series 0*i*-F.

8 ERROR MESSAGES DISPLAYED DURING PARAMETER SETTING

This chapter explains the error messages that are issued when Fast Ethernet/Fast Data Server parameters are set.



Messages	Meaning and action to be taken
Communication Software is not found	Check whether the communication software is installed.
Ethernet board is not found	Check whether the Fast Ethernet board is installed.
Software Version Error	The communication software version is illegal. Check the software version.
DATA IS OUT OF RANGE	A numeric parameter value is beyond the range.
Wrong Character(s)	An illegal character is used in a character parameter.
Format Error	Input data such as an IP address has an illegal input format.
too many figures	A value input in a numeric parameter consists of too many digits.
Data was rejected	A parameter error is found. Confirm the setting conditions described in the relevant manual.
Reading from SRAM failed	SRAM may have been destroyed.
Writing into SRAM failed	SRAM may have been destroyed.
DHCP is available	When the DHCP function is enabled, it is impossible to input parameters manually from the setting screen. To input parameters manually, disable the DHCP function.
Error(xxxx)	Other errors. Report the displayed message.

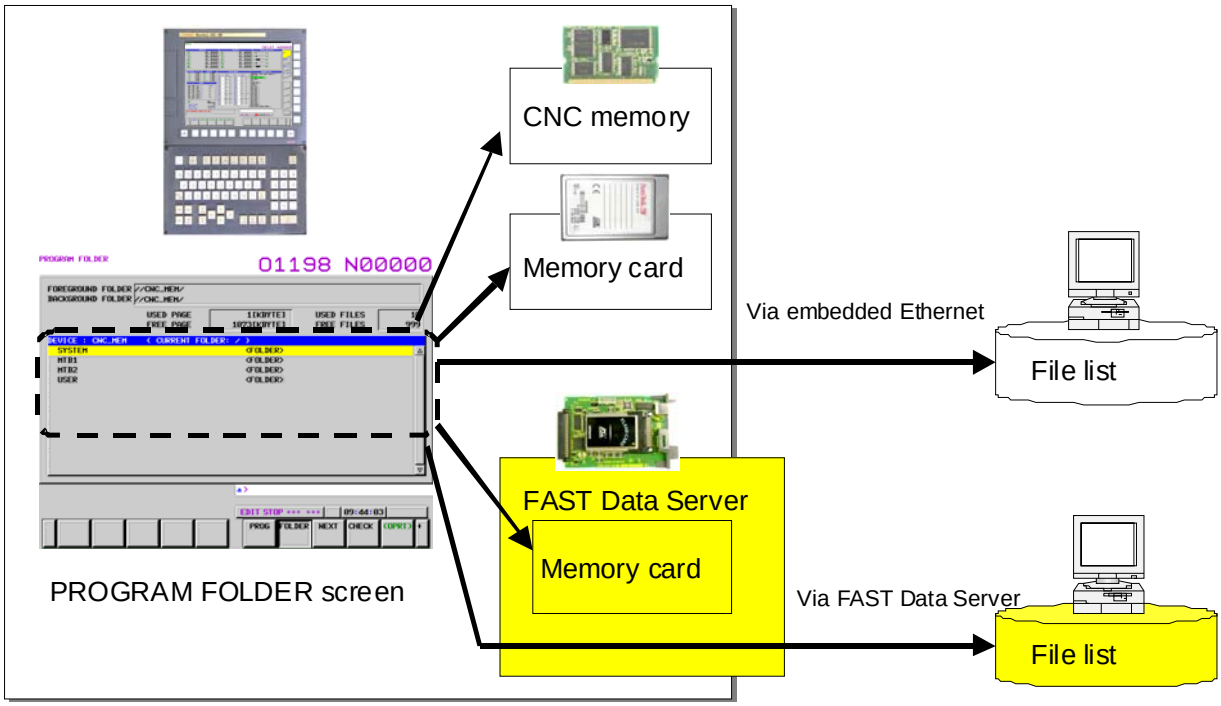
IV. OPERATION

1 OPERATING THE DATA SERVER FUNCTIONS

This chapter describes how to operate the Data Server functions.

On the PROGRAM FOLDER screen, files on the CNC memory, memory card, host computer connected via the embedded Ethernet, memory card built into the Fast Data Server, or host computer connected via the Fast Data Server can be handled by selecting a device.

Series 30*i*/31*i*/32*i*-A/B, Series 0*i*-F



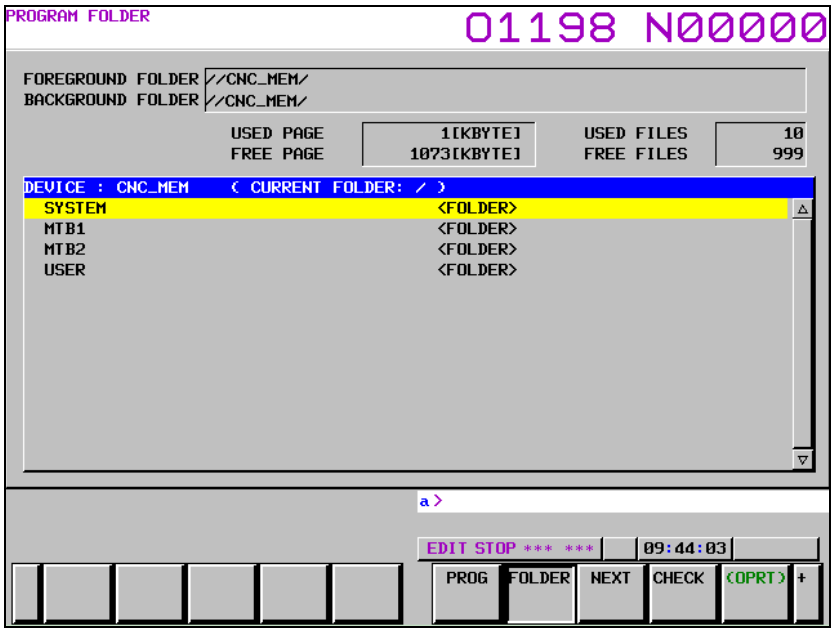
In this chapter, the method of handling files on the memory card built into the Fast Data Server and on the host computer connected via the Fast Data Server is described.

1.1 DEVICE CHANGE ON THE PROGRAM FOLDER SCREEN

Procedure

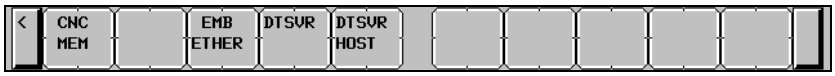
1 Press the function key [PROG].

2 Press soft key [FOLDER] to display the PROGRAM FOLDER screen. (When there is no soft keys, press the continue key.)



PROGRAM FOLDER screen

3 Press soft key [(OPRT)] then soft key [DEVICE CHANGE] to display the soft keys for selectable devices.



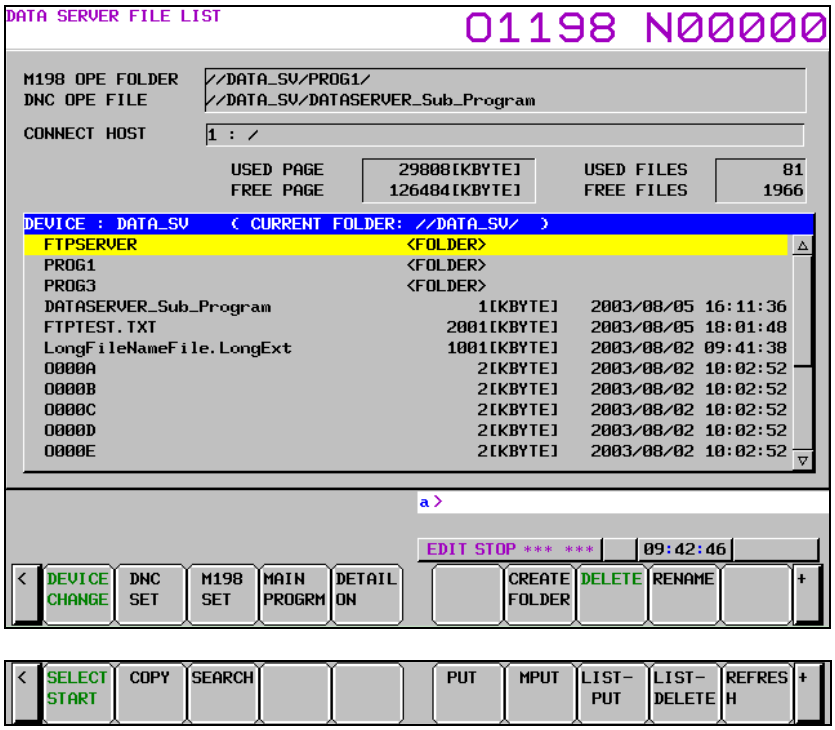
4 When you press soft key [DTSVR], the information displayed on the PROGRAM FOLDER screen is changed to the contents (DATA SERVER FILE LIST screen) of the memory card built into the Fast Data Server to enable file operation.

5 When you press soft key [DTSVR HOST], the information displayed on the PROGRAM FOLDER screen is changed to the contents (DATA SERVER HOST FILE LIST screen) of the hard disk of the host computer to enable file operation.

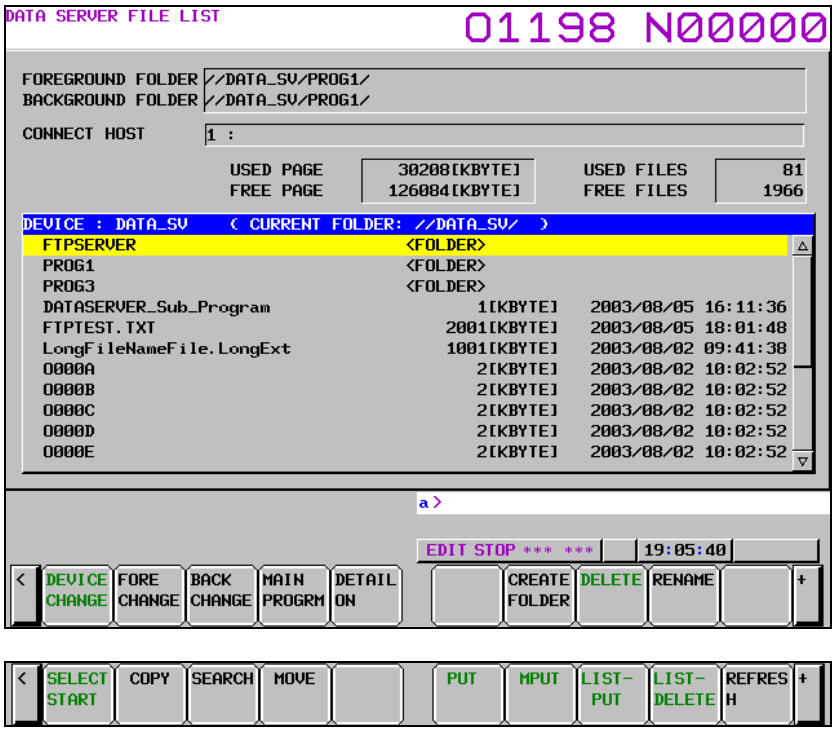
1.2 OPERATING THE DATA SERVER FILE LIST SCREEN

If [DTSVR] is selected to change the device on the PROGRAM FOLDER screen, the contents (DATA SERVER FILE LIST screen) of the memory card built into the Fast Data Server are displayed to enable file operation.

The information displayed on the DATA SERVER FILE LIST screen partly changes, depending on the setting of bit 1 (PDM) of parameter No. 3233.
When bit 1 (PDM) of parameter No. 3233 is set to 0, an M198 operation folder and DNC operation file can be set.
When bit 1 (PDM) of parameter No. 3233 is set to 1, foreground/background folders can be set.



DATA SERVER FILE LIST screen / When bit 1 (PDM) of parameter No. 3233=0



DATA SERVER FILE LIST screen / When bit 1 (PDM) of parameter No. 3233=1

Display item

M198 OPE FOLDER

Displays a folder (directory) for M198-based subprogram calling. This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 0.

DNC OPE FILE

Displays a file name used when DNC operation is performed. This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 0.

FOREGROUND FOLDER / BACKGROUND FOLDER

Displays foreground/background folders (directories). This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 1.

CONNECT HOST

Displays the work folder and the number of the host currently connected.

USED PAGE / FREE PAGE

Displays the size used of the memory card built into the Fast Data Server and the size that is free.

USED FILES / FREE FILES

Displays the total number of folders (files) in use of the Data Server and the number of remaining free folders (files).

DEVICE

Displays the current device. If the memory card built into the Fast Data Server is selected, "DATA_SV" is indicated.

CURRENT FOLDER

Displays the current work folder.

File list

Displays information about the files and folders in the current work folder.

Operation list

DEVICE CHANGE

Enables a device for display on the PROGRAM FOLDER screen. When selecting the memory card built into the Fast Data Server, press soft key [DTSVR].

DNC SET

Specifies a file for DNC operation. This soft key can be used when bit 1 (PDM) of parameter No. 3233 is set to 0.

M198 SET

Specifies a folder for M198-based subprogram calling. This soft key can be used when bit 1 (PDM) of parameter No. 3233 is set to 0.

FORE CHANGE / BACK CHNAGE

Specifies a foreground/background folder. These soft keys can be used when bit 1 (PDM) of parameter No. 3233 is set to 1.

MAIN PROGRM

Selects a file as a main program.

DETAIL OFF / DETAIL ON

Switches the file list information to overall display or detail display.

CREATE FOLDER
Creates a sub-folder under the current work folder.

DELETE
Deletes a file or folder.

RENAME
Renames a file or folder.

SELECT START
Selects multiple files.

COPY
Copies a file or files.

MOVE
Moves a file or files from one folder to another.

SEARCH
Searches for a file in the current work folder.

PUT
Transfers a file from the Data Server to the host computer.

MPUT
Transfers multiple files from the Data Server to the host computer.

LIST-PUT
Transfers multiple files from the Data Server to the host computer according to a list file.

LIST-DELETE
Deletes multiple files from the Data Server according to a list file.

READ (For the Series 30*i*/31*i*/32*i*-A)
F INPUT (For the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F)
Inputs an NC program in the host computer to part program storage of the CNC. This soft key is enabled only when the Data Server is in the storage mode and EDIT mode, and parameter No. 20 is set to “5”.

PUNCH (For the Series 30*i*/31*i*/32*i*-A)
F OUTPUT (For the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F)
Outputs an NC program in part program storage of the CNC to the host computer. This soft key is enabled only when the Data Server is in the storage mode and EDIT mode, and parameter No. 20 is set to “5”.

REFRESH
Updates the display information of the PROGRAM FOLDER screen.

NOTE

The operations of soft keys [CREATE FOLDER], [DELETE], [RENAME], [COPY], [MOVE], and [LIST-DELETE] are the target operations of the memory protection key.
This means that when the memory protection key is enabled, these operations result in a "WRITE PROTECT" error and cannot be performed.
For information about the memory protection key, refer to the CONNECTION MANUAL (FUNCTION) of the CNC.

1.2.1 Displaying and Operating the File List

REFRESH, DETAIL OFF, DETAIL ON

The contents of the file list can be updated and displayed.

1 Press soft key [REFRESH] to update the contents of the file list.
2 Press soft key [DETAIL OFF] to display a file name, size, and date.
3 Press soft key [DETAIL ON] to display a file list with file attributes and comments. A comment statement immediately following the O number of a file is displayed. When there is no comment statement, the contents starting with the beginning of the file are displayed.

NOTE

1 For a file selected as a main program and a file being used for memory operation, no comment is displayed in detail display mode.
2 The file attribute of a binary file is displayed as "R/B" to the right of the comment.

MOVE FOLDER

A work folder can be moved.

1 By using cursor keys [↓] [↑], select a folder to be moved.
2 Press the MDI key [INPUT].

CREATE FOLDER

A new folder can be created.

1 Move to a new folder to be created.
2 Enter a desired folder name.
3 Press soft key [CREATE FOLDER].

NOTE

1 Up to six levels of folders can be created.
2 No duplicate folder name is allowed within the same folder.
3 Each time a folder is created, the number of programs that can be registered decreases by one.
4 No folder may be able to be created, depending on the status such as operation state or protection state.

DELETE

Specifying a file or folder

A file or folder can be deleted.

1 By using cursor keys [↓] [↑], select a file or folder to be deleted.
2 Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

NOTE
1 The initial folder cannot be deleted.
2 A folder can be deleted only when the folder is empty.
(An empty folder means a folder that does not contain any folder and file.)
3 Files or folders may not be able to be deleted, depending on the status such as operation state or protection state.

Specifying multiple files

Multiple files can be deleted at a time.

1 Press soft key [SELECT START].
2 By using cursor keys [↓] [↑], select a file to be deleted.
3 Press soft key [SELECT].
A selected file is displayed in reverse video.
Repeat steps 2 and 3 for files to be deleted.
4 Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

NOTE
1 No folder can be specified.
2 Files may not be able to be deleted, depending on the status such as operation state or protection state.
3 Up to 10 files can be selected at a time.

DELETE (new method)

Specifying a file or folder

A file or folder can be deleted.

1 Place the cursor on the name of a file or folder to be deleted.
2 Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

Selecting a range

Multiple files or folders can be deleted.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be deleted and press soft key [RANGE SELECT].

3 By using cursor keys [↓] [↑], select a range of files to be deleted.
A selected file is displayed in reverse video.
4 When you have selected a desired range, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Selecting individual files or folders

Multiple files or folders can be deleted.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be deleted and press soft key [SELECT].
A selected file is displayed in reverse video.
3 Repeat step 2 for all files to be selected.
4 When you have selected desired files, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
1 Delete operation of the new procedure is performed when bit 3 (PCP) of parameter No. 11374 is set to 1 for the Series 30*i*/31*i*/32*i*-A or bit 4 (PCB) of parameter No. 11374 is set to 0 for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 The initial folder cannot be deleted.
3 Folders can also be specified and deleted only when the folders are empty. (An empty folder means a folder that does not contain any folder and file.)
4 Files or folders may not be able to be deleted, depending on the status such as operation state or protection state.
5 Up to 10 files can be selected at a time.

RENAME

A file or folder can be renamed.

1 By using cursor keys [↓] [↑], select a file or folder to be renamed.
2 Key a new file name or folder name.
3 Press soft key [RENAME].

NOTE
1 The initial folder cannot be renamed.
2 No duplicate folder name is allowed within the same folder.
3 Files and folders may not be able to be renamed, depending on the status such as operation state or protection state.

SEARCH

In the current work folder, a file can be found.

1 Enter a desired file name.
2 Press soft key [SEARCH].

COPY

Only one file

A file can be copied within the same folder.

1 Place the CNC in the EDIT mode.
2 By using cursor keys [↓] [↑], select a copy source file.
3 Key the name of a copy destination file.
4 Press soft key [COPY].

NOTE
1 Copy operation is impossible if the same file name is specified as a copy source file and copy destination file.
2 No folder can be specified.
3 Files may not be able to be copied, depending on the status such as operation state or protection state.

Selecting individual files or folders

Multiple files can be copied.

1 Place the CNC in the EDIT mode.
2 Press soft key [SELECT START].
3 By using cursor keys [↓] [↑], select a copy source file.
4 Press soft key [SELECT].
A selected file is displayed in reverse video.
Repeat steps 2 and 3 for files to be copied.
5 Press soft key [SELECT END].
6 Move to a copy destination folder.
7 Press soft key [COPY].

NOTE
1 Copy operation is impossible if the same folder is specified as a copy source folder and copy destination folder.
2 No folder can be specified.
3 Files may not be able to be copied, depending on the status such as operation state or protection state.
4 Up to 10 files can be selected at a time.

COPY (new method)

Only one file

One file can be copied.

1 Place the cursor on the name of a file to be copied and press soft key [COPY].
A selected file is displayed in reverse video.
2 Move to a copy destination folder.
3 Press soft key [PASTE].
To rename and copy the file, enter the new file name in the key-in buffer and press soft key [PASTE].

Selecting a range

Multiple files can be copied.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be copied and press soft key [RANGE SELECT].
3 By using cursor keys [↓] [↑], select a range of files to be copied.
A selected file is displayed in reverse video.
4 When you have selected a desired range, press soft key [COPY].
5 Move to a copy destination folder.
6 Press soft key [PASTE].

Selecting individual files or folders

Multiple files can be copied.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be copied and press soft key [SELECT].
A selected file is displayed in reverse video.
3 Repeat step 2 for all files to be selected.
4 When you have selected desired files, press soft key [COPY].
5 Move to a copy destination folder.
6 Press soft key [PASTE].

NOTE

1 Copy operation of the new procedure is performed when bit 3 (PCP) of parameter No. 11374 is set to 1 for the Series 30*i*/31*i*/32*i*-A or bit 4 (PCB) of parameter No. 11374 is set to 0 for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 With copy operation of the new procedure, not only a file or files, but also a folder or folders can be selected. In this case, all files in the selected folder(s) are copied.
3 Copy operation is impossible if the same folder is specified as a copy source folder and copy destination folder.
4 Files or folders may not be able to be copied, depending on the status such as operation state or protection state.
5 Up to 10 files can be selected at a time.

MOVE

A file or files can be moved.

1 Place the CNC in the EDIT mode.
2 Press soft key [SELECT START].
3 By using cursor keys [↓] [↑], select a move source file.
4 Press soft key [SELECT].
A selected file is displayed in reverse video.
Repeat steps 2 and 3 for files to be moved.
5 Press soft key [SELECT END].
6 Move to a move destination folder.
7 Press soft key [MOVE].

NOTE
1 Move operation is impossible if the same folder is specified as a move source folder and move destination folder.
2 No folder can be specified.
3 Files may not be able to be moved, depending on the status such as operation state or protection state.
4 Up to 10 files can be selected at a time.

MOVE (new method)

Only one file

One file can be moved.

1 Place the cursor on the name of a file to be moved and press soft key [CUT].
A selected file is displayed in reverse video.
2 Move to a move destination folder.
3 Press soft key [PASTE].
To rename and move the file, enter the new file name in the key-in buffer and press soft key [PASTE].

Selecting a range

Multiple files can be moved.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be moved and press soft key [RANGE SELECTT].
3 By using cursor keys [↓] [↑], select a range of files to be moved.
A selected file is displayed in reverse video.
4 When you have selected a desired range, press soft key [CUT].
5 Move to a move destination folder.
6 Press soft key [PASTE].

Selecting individual files or folders

Multiple files can be moved.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be moved and press soft key [SELECTT].
A selected file is displayed in reverse video.
3 Repeat step 2 for all files to be selected.
4 When you have selected desired files, press soft key [CUT].
5 Move to a move destination folder.
6 Press soft key [PASTE].

NOTE
1 Move operation of the new procedure is performed when bit 3 (PCP) of parameter No. 11374 is set to 1 for the Series 30*i*/31*i*/32*i*-A or bit 4 (PCB) of parameter No. 11374 is set to 0 for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 With move operation of the new procedure, not only a file or files, but also a folder or folders can be selected. In this case, all files in the selected folder(s) are moved.
3 Move operation is impossible if the same folder is specified as a move source folder and move destination folder.

NOTE
4 Files or folders may not be able to be moved, depending on the status such as operation state or protection state.
5 Up to 10 files can be selected at a time.

LIST-DELETE

By using a list file, multiple files in the Data Server can be deleted.

1 By using cursor keys [↓] [↑], select a list file.
2 Press soft key [LIST-DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

When execution is selected, the files in the Data Server are deleted according to the list file.

NOTE
Files cannot sometimes be deleted depending on the operation status and protection status.

1.2.2 File Transfer Operation

Files can be transferred from the Data Server to the host computer.

NOTE
If an error occurs, check the cause of the error according to the Item, “ETHERNET LOG screen” in Section 2.1, “ETHERNET LOG” in Part VI, “MAINTENANCE.”

PUT

A file can be transferred from the Data Server to the host computer.

1 By using cursor keys [↓] [↑], select a file to be transferred.
2 Press soft key [PUT].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.
3 When a file is to be transferred to the host computer under a different file name, enter the desired transfer destination file name before pressing soft key [PUT].

MPUT

Multiple files can be transferred from the Data Server to the host computer.

1 Enter the names of files to be transferred. Specify the names of files using wildcards (*, ?).
2 Press soft key [MPUT].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

LIST-PUT

Multiple files can be transferred from the Data Server to the host computer according to a list file.

1 By using cursor keys [↓] [↑], select a list file.
2 Press soft key [LIST-PUT].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

When execution is selected, the files are transferred from the Data Server to the host computer according to the list file.

1.2.3 Preparations for File Operation and Editing

MAIN PROGRM

A selected file can be registered as a main program.

1 Select the EDIT mode or MEM mode.
2 By using cursor keys [↓] [↑], select a file to be registered as a main program.
3 Press soft key [MAIN PROGRM].

A registered main program can be executed in memory operation or edited.

NOTE
1 No file may be able to be selected, depending on the status such as operation state or protection state.
2 Only a text file can be selected as a main program.
3 For a file selected as a main program and a file being used for memory operation, no comment is displayed in detail display mode.
4 For a file selected as a main program, other file operations are disabled.
5 For memory operation and editing, refer to the OPERATOR'S MANUAL of the CNC.

M198 SET

A folder for M198-based subprogram calling can be specified.

1 Move to the folder containing a file to be called by M198-based subprogram calling.
2 Press soft key [M198 SET].

NOTE
1 No file may be able to be set, depending on the status such as operation state or protection state.
2 This setting is valid when the operating mode of the Data Server is the storage mode.
3 The specified folder name is stored and can be used without specifying it at the next power-on.

DNC SET

A file used for DNC operation can be selected.

1 Move to the folder containing a file to be used for DNC operation.
2 By using cursor keys [↓] [↑], select a file to be used for DNC operation.
3 Press soft key [DNC SET].

NOTE
1 No file may be able to be set, depending on the status such as operation state or protection state.
2 This setting is valid when the operating mode of the Data Server is the storage mode.
3 The specified file name is not stored. Accordingly, specify a file again after turning the power off, then on again.

FORE CHANGE / BACK CHANGE

A foreground/background folder can be specified.

1 Move to the folder containing a foreground/background file.
2 Press soft key [FORE CHANGE] or [BACK CHANGE].

1.2.4 File Operation between the Data Server and USB Memory

You can copy files or folders between the Data Server and USB memory.
By selecting a folder, you can copy the files or folders in that folder.

NOTE
1 This function is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 The function is valid when bit 4 (PCB) of parameter No. 11374 is set to 0.
3 Files and folders cannot be moved.

Copying a file or folder

1 Place all paths in the EDIT mode or emergency stop state.
2 Select a copy source device and move to a copy source folder.
3 Place the cursor on the file or folder to be copied and press soft key [COPY].
A selected file is displayed in reverse video.
4 Select a copy destination device and move to a copy destination folder.
5 Press soft key [PASTE].
To rename and copy the file or folder, enter the new file or folder name in the key-in buffer and press soft key [PASTE].
6 To copy a file or folder from the USB memory to the Data Server, press soft key To copy a file or folder from the USB memory to the Data Server, press soft key [PROGRAM] or [DATA] to specify the attribute (program or data) of the copy destination file. (Note 1)
To rename and copy the file or folder, enter the new file or folder name in the key-in buffer before pressing soft key [PROGRAM] or [DATA].

Copying multiple files or folders

Selecting a range

1 Place all paths in the EDIT mode or emergency stop state.

2 Select a copy source device and move to a copy source folder.
3 Press soft key [SELECT].
4 Place the cursor on the file or folder to be copied and press soft key [RANGE SELECT].
A selected file is displayed in reverse video.
5 By using cursor keys [↓] [↑], select a range of files to be copied.
A selected file is displayed in reverse video.
6 When you have selected a desired range, press soft key [COPY].
7 Select a copy destination device and move to a copy destination folder.
8 Press soft key [PASTE].
9 To copy a file or folder from the USB memory to the Data Server, press soft key [PROGRAM] or [DATA] to specify the attribute (program or data) of the copy destination file.(Note 1)

Selecting individual files or folders

1 Place all paths in the EDIT mode or emergency stop state.
2 Select a copy source device and move to a copy source folder.
3 Press soft key [SELECT].
4 Place the cursor on the file or folder to be copied and press soft key [SELECT].
A selected file is displayed in reverse video.
5 Repeat step 4 for all files or folders to be selected.
6 Select a copy destination device and move to a copy destination folder.
7 Press soft key [PASTE].
8 To copy a file or folder from the USB memory to the Data Server, press soft key [PROGRAM] or [DATA] to specify the attribute (program or data) of the copy destination file.(Note 1)

⚠ WARNING

When a file containing multiple programs is copied from the USB memory to the Data Server, the file is not divided into the programs and the programs are not registered individually on the Data Server. The programs are registered as one series of programs. Be sure to copy a file containing one program. Operating the machine after copying a file containing multiple programs is dangerous because the machine may behave unexpectedly.

NOTE

1 The program (text file) attribute can be specified only when bit 1 (DUC) of parameter No. 24309 is set to 1.
On the Data Server, various types of data can be saved in addition to text format NC programs.
To handle text format NC programs, set the program (text file) attribute. To handle NC programs for high-speed binary operation and NC data other than text format NC programs, set the data (binary file) attribute. For details of programs (text files) and data (binary files), see Section 2.1, "DATA SERVER FILE MANAGEMENT" in Part II, "SPECIFICATION".
2 To copy multiple files from the USB memory to the Data Server, do not select program files and data files simultaneously. When multiple files are selected, the specified attribute is set for all selected files. When a folder is selected, the specified attribute is also set for all files in the folder.
3 If the system is placed in other than the EDIT mode or emergency stop state during copy operation between the Data Server and USB memory, the copy operation is stopped. Do not change the mode during copy operation.
4 Files or folders may not be able to be copied, depending on the status such as operation state or protection state.

NOTE
5 Up to 10 files or folders can be selected individually or by selecting a range.

Copying a file or folder when a file or folder having the same name is found

If a file or folder having the same name as a file or folder to be copied is found in the copy destination, the confirmation message, "OVERWRITE? (program or folder name)" is displayed.

- Press soft key [YES] to overwrite only the found file or folder. If another file or folder having the same name is found, the confirmation message is displayed again.
- Press soft key [NO] to continue with copy operation without overwriting the found file or folder. If another file or folder having the same name is found, the confirmation message is displayed again.
- Press soft key [YES ALL] to continue with copy operation while overwriting the found file or folder and subsequently found files or folders.
- Press soft key [NO ALL] to continue with copy operation without overwriting the found file or folder and subsequently found files or folders.
- Press soft key [CANCEL] or [<] to terminate copy operation.

If another screen is displayed while the confirmation message is being displayed, overwrite operation is canceled and copy operation is stopped.

Limitations

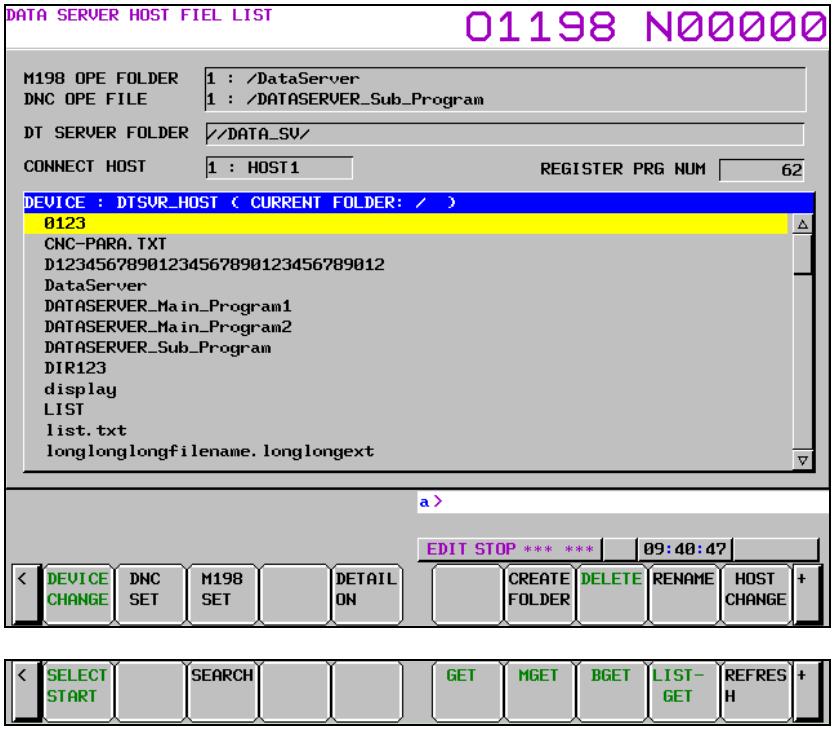
If the following condition is met, copy operation is disabled:
- The copy destination folder is a subfolder of the copy source folder.

If any of the following conditions is met, the relevant file or folder is not copied:
- The copy source or destination file or folder is protected by a function such as the program protection function.
- The protection level (output) is higher than the operation level of 8-level data protection.
- An attempt is made to overwrite a file containing a main program or a program during operation.
- The folder path depth after copy operation exceeds six levels.

If a folder containing a file or folder which cannot be copied is specified as the copy source, copy operation is stopped. Files or folders are copied to the copy destination before copy operation is stopped.
If a folder cannot be copied, the files or folders in that folder cannot also be copied.

1.3 OPERATING THE DATA SERVER HOST FILE LIST SCREEN

Host computer files can be operated on the DATA SERVER HOST FILE LIST screen.



DATA SERVER HOST FILE LIST screen

> **NOTE**
> A file name containing a 2-byte code used for Japanese and others may not be displayed correctly.

Display item

M198 OPE FOLDER

Displays a folder (directory) for M198-based subprogram calling.

DNC OPE FILE

Displays a file name used when DNC operation is performed.

DT SERVER FOLDER

Displays the work folder (directory) of the Data Server (memory card).

CONNECT HOST

Displays the number of the host computer currently connected.

DEVICE

Displays the current device. If the host file list of the Data Server is selected, "DTSVR_HOST" is indicated.

CURRENT FOLDER

Displays the work folder in the current host computer.

FILE LIST
Displays information about the files and folders in the host computer.

Operation list

DEVICE CHANGE
Enables a device for display on the PROGRAM FOLDER screen. When selecting the host file list of the Data Server, press soft key [DTSVR HOST].

DNC SET
Specifies a file for DNC operation.

M198 SET
Specifies a folder for M198-based subprogram calling.

DETAIL OFF / DETAIL ON
Switches the file list information to overall display or detail display.

CREATE FOLDER
Creates a sub-folder under the current work folder.

DELETE
Deletes a file or folder.

RENAME
Renames a file or folder.

HOST CHANGE
Changes the connected host computer.

SEARCH
Searches for a file in the current folder.

GET
Transfers a file from the host computer to the Data Server.

MGET
Transfers files from the host computer to the Data Server by specifying a file name with wildcards (*, ?).

BGET
Transfers a file from the host computer to the Data Server in binary format. Use this soft key to transfer a binary-format NC program or data other than an NC program such as NC parameter or tool data.

LIST-GET
Transfers multiple files from the host computer to the Data Server according to a list file.

READ (For the Series 30*i*/31*i*/32*i*-A)
F INPUT (For the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F)
Inputs an NC program in the host computer to part program storage of the CNC. This soft key is enabled only when the Data Server is in the FTP mode and EDIT mode, and parameter No. 20 is set to 5.

PUNCH (For the Series 30*i*/31*i*/32*i*-A)
F OUTPUT (For the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F)

Outputs an NC program in part program storage of the CNC to the host computer. This soft key is enabled only when the Data Server is in the FTP mode and EDIT mode, and parameter No. 20 is set to 5.

REFRESH

Updates the information displayed on the DATA SERVER HOST FILE LIST screen.

> **NOTE**
> The operations of soft keys [GET], [MGET], [BGET], and [LIST-GET] are the target operations of the memory protection key.
> This means that when the memory protection key is enabled, these operations result in a "WRITE PROTECT" error and cannot be performed.
> For information about the memory protection key, refer to the CONNECTION MANUAL (FUNCTION) (B-63943EN-1) of the CNC.

1.3.1 Displaying and Operating the File List

RENAME, DETAIL OFF, DETAIL ON

The contents of the file list can be updated and displayed.

1 Press soft key [REFRESH] to update the contents of the file list.
2 Press soft key [DETAIL OFF] to display a file name only.
3 Press soft key [DETAIL ON] to display a file attribute, size, date, and file name.

> **NOTE**
> 1 The information displayed with soft key [DETAIL ON] depends on the setting of the FTP server on the host computer.
> 2 When a file operation is performed in the detail display mode, the rightmost information displayed on the screen is handled as the file name. For this reason, the file operation may not be performed correctly depending on the displayed information or file name. In this case, set the overall display mode and perform the file operation.
> 3 When many files are registered in a target folder, it may take time to display a file list.

MOVE FOLDER

A work folder can be moved.

1 By using cursor keys [↓] [↑], select a folder to be moved.
2 Press the MDI key [INPUT].

CREATE FOLDER

A new folder can be created.

1 Move to a new folder to be created.
2 Enter a desired folder name.
3 Press soft key [CREATE FOLDER].

DELETE

Specifying a file or folder

A file or folder can be deleted.

1 By using cursor keys [↓] [↑], select a file or folder to be deleted.
2 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Specifying multiple files

Multiple files or folder can be deleted.

1 Press soft key [SELECT START].
2 By using cursor keys [↓] [↑], select a file to be deleted.
3 Press soft key [SELECT].
A selected file is displayed in reverse video.
Repeat steps 2 and 3 for files to be deleted.
4 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
Up to 10 files can be selected at a time.

DELETE (new method)

Specifying a file or folder

A file or folder can be deleted.

1 Place the cursor on the name of a file or folder to be deleted.
2 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Selecting a range

Multiple files or folders can be deleted.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be deleted and press soft key [RANGE SELECT].
3 By using cursor keys [↓] [↑], select a range of files to be deleted.
A selected file is displayed in reverse video.
4 When you have selected a desired range, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Selecting individual files or folders

Multiple files or folders can be deleted.

1 Press soft key [SELECT].

2 Place the cursor on the name of a file to be deleted and press soft key [SELECT].
A selected file is displayed in reverse video.
3 Repeat step 2 for all files to be selected.
4 When you have selected desired files, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
1 Delete operation of the new procedure is performed when bit 3 (PCP) of parameter No. 11374 is set to 1 for the Series 30*i*/31*i*/32*i*-A or bit 4 (PCB) of parameter No. 11374 is set to 0 for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 Up to 10 files can be selected at a time.

RENAME

A file or folder can be renamed.

1 By using cursor keys [↓] [↑], select a file or folder to be renamed.
2 Key a new file name or folder name.
3 Press soft key [RENAME].

SEARCH

In the current work folder, a file can be found.

1 Enter a desired file name.
2 Press soft key [SEARCH],

HOST CHANGE

The connected host computer can be changed.

1 Press soft key [HOST CHANGE].
The connected host number changes in the order 1 → 2 → 3 → 1.

1.3.2 File Transfer Operation

Files can be transferred from the host computer to the Data Server.

⚠ **WARNING**
When a file containing multiple NC programs is transferred from the host computer to the Data Server, the file is not divided into the NC programs and the NC programs are not registered individually on the Data Server. The NC programs are registered as one series of NC programs.
Operating the machine after transferring a file containing multiple NC programs is dangerous because the machine may behave unexpectedly.
Be sure to transfer a file containing one NC program.

NOTE
If an error occurs, check the cause of the error according to the Item, “ETHERNET LOG screen” in Section 2.1, “ETHERNET LOG” in Part VI, “MAINTENANCE.”

GET

An NC program can be transferred from the host computer to the Data Server.

1 By using cursor keys [↓] [↑], select a file to be transferred.
2 Press soft key [GET].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

3 When a file is to be transferred to the Data Server under a different file name, enter the desired transfer destination file name before pressing soft key [GET].

NOTE
1 Files cannot sometimes be transferred depending on the operation status and protection status.
2 Use this operation only for text format NC programs.

MGET

Multiple NC programs can be transferred from the host computer to the Data Server.

1 Enter the names of files to be transferred. Specify the names of files using wildcards (*, ?).
2 Press soft key [MGET].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
1 Files cannot sometimes be transferred depending on the operation status and protection status.
2 Use this operation only for text format NC programs.

BGET

A file can be transferred from the host computer to the Data Server.

1 By using cursor keys [↓] [↑], select a file to be transferred.
2 Press soft key [BGET].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

3 When a file is to be transferred to the Data Server under a different file name, enter the desired transfer destination file name before pressing soft key [BGET].

NOTE
1 Files cannot sometimes be transferred depending on the operation status and protection status.
2 When transferring binary format NC programs and NC data such as tool offset data, be sure to use the binary format.

LIST-GET

Multiple files can be transferred from the host computer to the Data Server according to a list file.

1 By using cursor keys [↓] [↑], select a list file.
2 Press soft key [LIST-GET].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

When execution is selected, the files are transferred from the host computer to the Data Server according to the list file.

NOTE
Files cannot sometimes be transferred depending on the operation status and protection status.

1.3.3 Preparations for File Operation

M198 OPE

A folder for M198-based subprogram calling can be specified.

1 Move to the folder containing a file to be called by M198-based subprogram calling.
2 Press soft key [M198 SET].

NOTE
1 No file may be able to be set, depending on the status such as operation state or protection state.
2 This setting is valid when the operating mode of the Data Server is the FTP mode or buffer mode.
3 The specified folder name is stored and can be used without specifying it at the next power-on.

DNC OPE

A file used for DNC operation can be selected.

1 Move to the folder containing a file to be used for DNC operation.
2 By using cursor keys [↓] [↑], select a file to be used for DNC operation.
3 Press soft key [DNC SET].

NOTE
1 No file may be able to be set, depending on the status such as operation state or protection state.
2 This setting is valid when the operating mode of the Data Server is the FTP mode or buffer mode.
3 The specified file name is not stored. Accordingly, specify a file again after turning the power off, then on again.

1.4 M198-BASED SUBPROGRAM CALL

If the Data Server is placed in the storage mode, an M198-based subprogram call can be made using an NC program in the Data Server.
If the Data Server is placed in the FTP mode, an M198-based subprogram call can be made using an NC program in the host computer. If the Data Server is placed in the buffer mode, an M198-based subprogram call can be made using an NC program of the buffer mode format in the host computer.

⚠WARNING
If you want to execute an M198-based subprogram call, be sure to make sure that an M198 operation folder is set correctly before starting operation.
If you start operation before checking the above, an unexpected subprogram may be executed, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

NOTE
1 An M198-based subprogram call cannot be executed simultaneously with NC program input, NC program output, and DNC operation.
2 In an M198-based subprogram call, no additional M198-baesd subprogram call can be made.
3 M198-based subprogram calls do not allow use of file names. Use a program number to make an M198-based call.

Subprogram call in the storage mode

Procedure

1 Check that the Data Server is placed in the storage mode.
2 Set the CNC to the MEM mode.
3 Display the DATA SERVER FILE LIST screen to check that an M198 operation folder is set.
4 Automatically operate the NC program including the M198 command.

Subprogram call in the FTP mode

Procedure

1 Check that the Data Server is placed in the FTP mode.
2 Set the CNC to the MEM mode.
3 Display the DATA SERVER HOST FILE LIST screen to check that an M198 operation folder is set.
4 Automatically operate the NC program including the M198 command.

Subprogram call in the buffer mode

Procedure

1 Check that the Data Server is placed in the buffer mode.
2 Set the CNC to the MEM mode.
3 Display the DATA SERVER HOST FILE LIST screen to check that an M198 operation folder is set.
4 Automatically operate the NC program including the M198 command.

1.5 DNC OPERATION

If the Data Server is placed in the storage mode, DNC operation can be performed using an NC program in the Data Server.
If the Data Server is placed in the FTP mode, DNC operation can be performed using an NC program in the host computer.
If the Data Server is placed in the buffer mode, DNC operation can be performed using an NC program of the buffer mode format in the host computer.

⚠WARNING
If you want to execute DNC operation, be sure to make sure that a DNC operation file is set correctly before starting operation.
If you start operation before checking the above, an unexpected program may be executed, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

NOTE
A DNC operation cannot be executed simultaneously with NC program input, NC program output, and M198-based subprogram call.

DNC operation in the storage mode

Procedure

1 Check that the Data Server is placed in the storage mode.
2 Set the CNC to the RMT mode.
3 Display the DATA SERVER FILE LIST screen to check that a DNC operation file is set.
4 Perform a cycle start to execute DNC operation.

DNC operation in the FTP mode

Procedure

1 Check that the Data Server is placed in the FTP mode.
2 Set the CNC to the RMT mode.
3 Display the DATA SERVER HOST FILE LIST screen to check that a DNC operation file is set.
4 Perform a cycle start to execute DNC operation.

DNC operation in the buffer mode

Procedure

1 Check that the Data Server is placed in the buffer mode.
2 Set the CNC to the RMT mode.
3 Display the DATA SERVER HOST FILE LIST screen to check that a DNC operation file is set.
4 Perform a cycle start to execute DNC operation.

1.6 NC PROGRAM INPUT

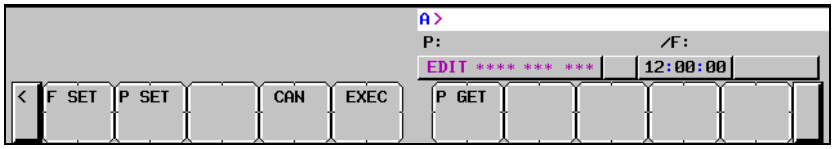
When the Data Server mode is the storage mode, NC programs on the Data Server can be input to part program storage of the CNC.
When the Data Server mode is the FTP mode, NC programs on the host computer can be input to part program storage of the CNC.
When the Data Server mode is the buffer mode, buffer mode format NC programs on the host computer can be input to part program storage of the CNC.

> ⚠ **CAUTION**
> If bit 2 (REP) of parameter No. 3201 is set to 1, when an NC program having the same file name as an NC program to be input is already present in part program storage, the existing NC program is overwritten.

> **NOTE**
> NC programs cannot be input simultaneously with an NC program output, M198-based subprogram call, and DNC operation.

Procedure

1. Place the CNC in the EDIT mode.
2. Display the PROGRAM screen or PROGRAM FOLDER screen.
3. Press soft key [READ] ([F INPUT] for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F).
4. In the key-in buffer, enter the name of a file to be input on the Data Server, and press soft key [F SET].
   When the file name on the Data Server is not set, file name "ALL-PROG.TXT" is used by default.
5. To rename the input file and input it into part program storage, enter the new file name in the key-in buffer, and press soft key [P SET].
6. Press soft key [EXEC].
7. During inputting, "INPUT" blinks in the lower right part of the screen.



> **NOTE**
> In the buffer mode, a file specified with soft key [F SET] is treated as a file list. Therefore, NC program input processing is performed on the assumption that files defined in the file list are a continuous file image.

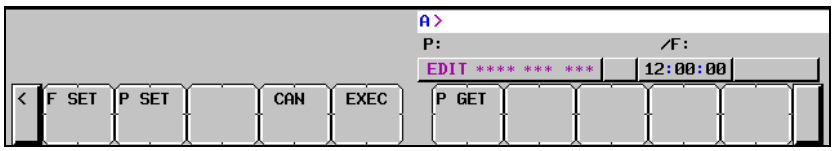
1.7 NC PROGRAM OUTPUT

When the Data Server mode is the storage mode or buffer mode, NC programs in part program storage of the CNC can be output to the Data Server.
When the Data Server mode is the FTP mode, NC programs in part program storage of the CNC can be output to the host computer.

> **NOTE**
> NC programs cannot be output simultaneously with an NC program input, M198-based subprogram call, and DNC operation.

Procedure

1 Place the CNC in the EDIT mode.
2 Display the PROGRAM screen or PROGRAM FOLDER screen.
3 Press soft key [PUNCH] ([F OUTPUT] for the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F).
4 In the key-in buffer, enter the name of a file to be output in part program storage, and press soft key [P SET].
When a specific file name in part program storage is not set, all files in the foreground folder are assumed to be output.
5 To rename the output file and output it to the Data Server, enter the new file name in the key-in buffer, and press soft key [F SET].
When only a file in part program storage is specified, but no file name on the Data Server is specified, a file is created with the file name used in part program storage.
6 Press soft key [EXEC].
7 During outputting, "OUTPUT" blinks in the lower right part of the screen.



NOTE

1 When neither file in part program storage nor file name on the Data Server is specified, all files in the foreground folder are output with file name "ALL-PROG.TXT" to the Data Server.
2 When an NC program is output in the storage mode or buffer mode, if a file with the same name is already present on the memory card of the Data Server, an error occurs.

1.8 FTP SERVER FUNCTIONS

The FTP server functions allow communication with FTP clients on the host computer.

NOTE

1 Up to five FTP clients can be connected to the FTP server. Some FTP client software products may attempt to internally connect the FTP server as two or more FTP clients, however. For this reason, the number of FTP clients actually connected may differ from that of FTP client applications that can be connected. If the DataServer Explorer connection is enabled, one CNC can connect up to ten FTP clients.
For the DataServer Explorer connection, see Section 2.7, "DATASERVER Explorer CONNECTION," in Part II, "SPECIFICATION."

2 On the memory card on the Data Server, text files and binary files are distinguished from each other. You can specify text (ASCII) or binary (image) when transferring a file from the FTP client to use the file as a text or binary file. The file attribute can be fixed to text or binary regardless of which is specified from the FTP client according to the setting of parameter No. 929. For details, see Section 2.2, “RELATED NC PARAMETERS” in Part III, “SETTING”.

3 The creation date and time of a folder are not managed in the Data Server. For this reason, the creation date and time of a folder in folder information obtained from a personal computer are January 1, 2000.

4 Since the file size is managed in units of 500 bytes on the memory card on the Data Server, the file size in units of 500 bytes can be obtained from a personal computer.

2 OPERATING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

This chapter describes how to operate the machine remote diagnosis functions.

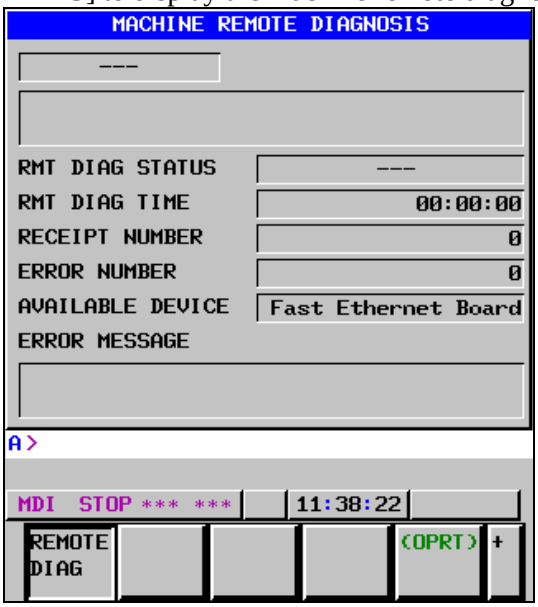
2.1 OPERATING THE MACHINE REMOTE DIAGNOSIS SCREEN

Procedure

1 Press the function key SYSTEM.

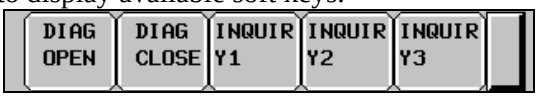
2 Soft key [REMOTE DIAG] appear. (When there is no soft keys, press the continue key.)

3 Press soft key [REMOTE DIAG] to display the machine remote diagnosis screen.



Machine remote diagnosis screen

4 Press soft key [(OPRT)] to display available soft keys.



Display item

INQUIRY NUMBER

Displays the inquiry number indicating the machine remote diagnosis accepting server: "INQUIRY1," "INQUIRY2," or "INQUIRY3."

INQUIRY

Displays information for identifying the machine remote diagnosis accepting server.

RMT DIAG STATUS

Displays the status of machine remote diagnosis.

RMT DIAG TIME

Displays the time until the machine remote diagnosis status changes from "OPEN" to "CLOSE," "FORCE CLOSING," or "ERROR."

At each start of diagnosis, the time is accumulated from "00:00:00."

RECEIPT NUMBER
Displays the receipt number issued by the machine remote diagnosis accepting server.

ERROR NUMBER
Displays the number of an error which occurs in operation of the machine remote diagnosis functions.

AVAILABLE DEVICE
Displays the type of communication device for which the machine remote diagnosis functions can operate.

ERROR MESSAGE
Displays the message indicating an error which occurs in operation of the machine remote diagnosis functions.

Operation list

DIAG OPEN
Starts machine remote diagnosis.

DIAG CLOSE
Forcibly terminates machine remote diagnosis.

INQUIRY1
Selects inquiry destination 1.

INQUIRY2
Selects inquiry destination 2.

INQUIRY3
Selects inquiry destination 3.

2.1.1 Selecting an Inquiry Destination

Select an inquiry destination among inquiry destinations 1 to 3.

1 Press soft key [(OPRT)].
2 Press soft key [INQUIRY1] to select inquiry destination 1.
3 Similarly, press soft key [INQUIRY2] to select inquiry destination 2 and soft key [INQUIRY3] to select inquiry destination 3.

2.1.2 Starting Diagnosis

Start diagnosis.

1 Press soft key [(OPRT)].
2 Press soft key [DIAG OPEN] to start diagnosis.

2.1.2.1 Diagnosis status

Status	Description
---	No operation
OPEN	[DIAG OPEN] was pressed.
OPENING	An attempt is being made to connect the machine remote diagnosis accepting server.

Status	Description
ACCEPTED	The machine remote diagnosis accepting server accepted diagnosis.
REFUSED	The machine remote diagnosis accepting server rejected diagnosis.
DIAGNOSING	This message flashes in synchronization with data flowing on the communication line.
CLOSE	The machine remote diagnosis accepting server terminated diagnosis.
FORCE CLOSING	[DIAG CLOSE] was pressed. After the completion of forced termination processing, "---" is indicated in the RMT DIAG STATUS field.
ERROR	An error occurred on the communication line.

2.1.2.2 Error numbers and error messages

Number	Error message	Meaning and action to be taken
1	Diagnosis is busy	[DIAG OPEN] was pressed during diagnosis.
2	Router isn't alive	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.
3	Receipt Server isn't alive	The IP address of the machine remote diagnosis accepting server may be invalid or the machine remote diagnosis accepting server may not be operating. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the machine remote diagnosis accepting server is operating.
4	System error	A system error occurred. Check the log messages on the ETHERNET LOG screen and contact FANUC.
5	Invalid Inquiry number.	A value outside the valid setting range may be set for the inquiry destination. Check whether the correct inquiry destination is set.
6	Invalid IP Address	Set the IP address according to the IP address specification format.
7	Invalid PORT number	A value outside the valid setting range may be set for the port number. Check whether the correct port number is set.
8	Invalid Router IP Address	Set the IP address of the router according to the IP address specification format.
9	Socket error	A communication error occurred due to a cause as listed below. Check the network wiring and anti-noise measures. → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected.
11	Invalid Request	An internal error related to machine remote diagnosis occurred in the CNC. Check the log messages on the ETHERNET LOG screen and contact FANUC.
12	Invalid Packet	An unrecognizable packet was received. Check the log messages on the ETHERNET LOG screen and contact FANUC.
13	Diagnosis was already stopped	[DIAG CLOSE] was pressed not during diagnosis.
17	Receive error	An attempt to receive data failed. See Number 9 and check the network wiring and anti-noise measures.
19	HeartBeat timeout	Communication with the machine remote diagnosis accepting server stopped. See Number 9 and check the network wiring and anti-noise measures.
20	HeartBeat error	An attempt was failed to send a heartbeat packet for machine remote diagnosis. See Number 9 and check the network wiring and anti-noise measures.

Number	Error message	Meaning and action to be taken
22	DNS error	An attempt was failed to connect the machine remote diagnosis accepting server using the DNS function. The IP address of the DNS server may be invalid or the power to the DNS server may be off. Check whether the IP address of the DNS server is valid and whether the power to the DNS server is on.

2.1.3 Forcibly Terminating Diagnosis

Forcibly terminate diagnosis.

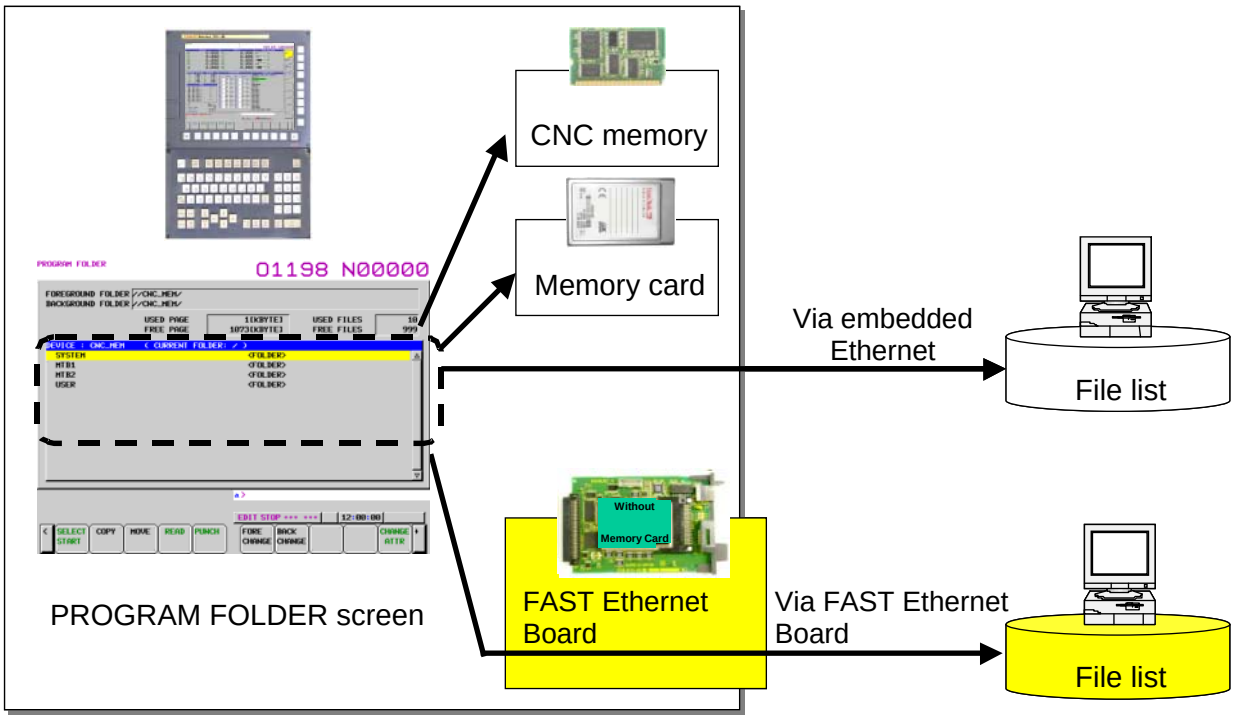
1 Press soft key [(OPRT)].
2 Press soft key [DIAG CLOSE] to forcibly terminate diagnosis.

3 OPERATING THE FTP FILE TRANSFER FUNCTION

This chapter describes how to operate the FTP File Transfer function.

On the PROGRAM FOLDER screen, files on the CNC memory, memory card, host computer connected via the embedded Ethernet or host computer connected via the Fast Ethernet can be handled by selecting a device.
In the following examples, the Fast Ethernet board is used. Operations are the same when Multi-function Ethernet is used.

Series 30*i*/31*i*/32*i*–A/B, 35*i*–B, PM*i*–A, 0*i*-F



In this manual, the method of handling files on the host computer connected via the Fast Ethernet is described.

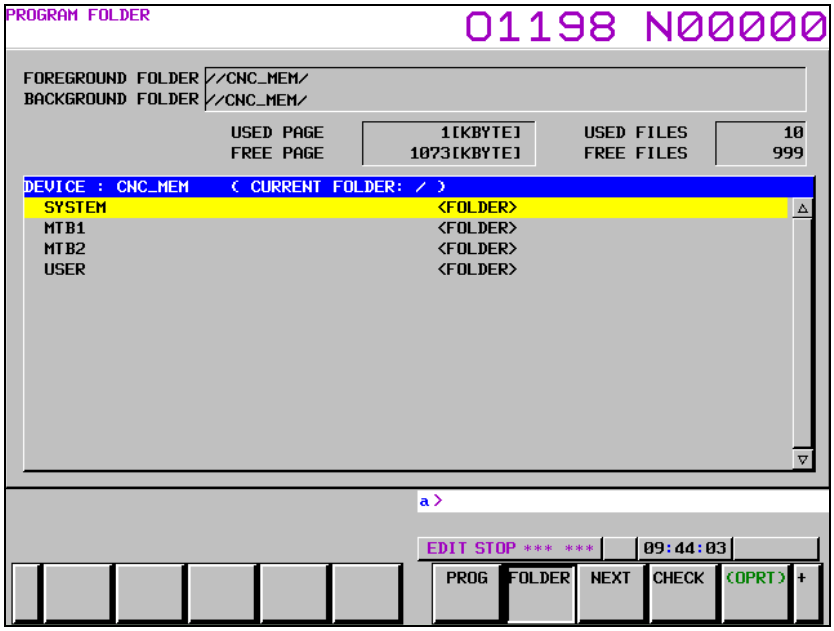
NOTE
The FTP file transfer function cannot perform an M198-based subprogram call or DNC operation. To perform it, use the Data Server functions.

3.1 DEVICE CHANGE ON THE PROGRAM FOLDER SCREEN

Procedure

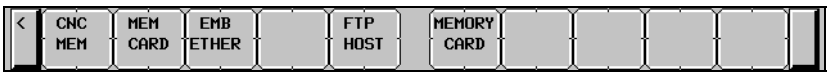
1 Press the function key .

2 Press soft key [FOLDER] to display the PROGRAM FOLDER screen. (When there is no soft keys, press the continue key.)



PROGRAM FOLDER screen

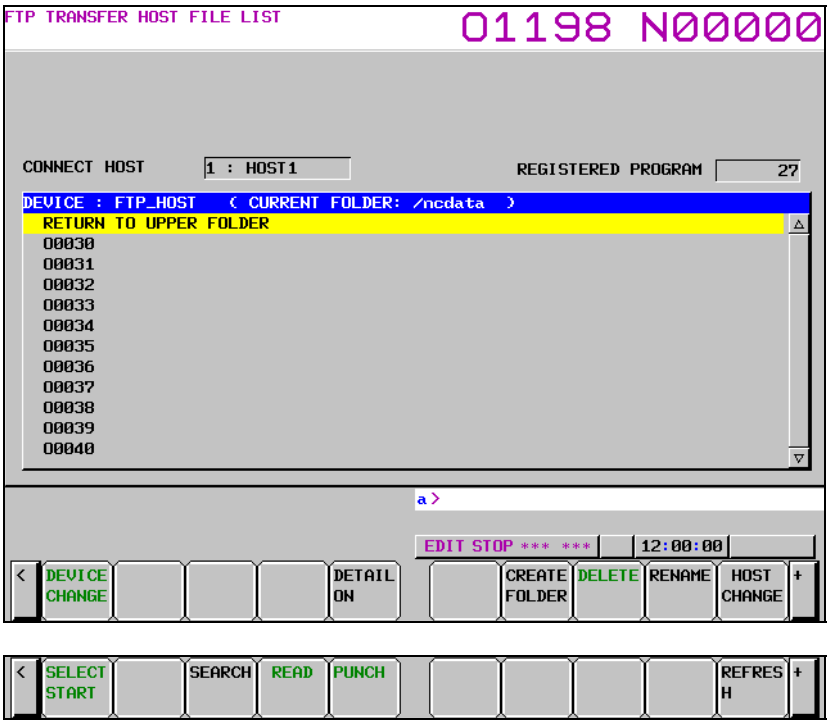
3 Press soft key [(OPRT)] then soft key [DEVICE CHANGE] to display the soft keys for selectable devices.



4 When you press soft key [FTP HOST], the information displayed on the PROGRAM FOLDER screen is changed to the contents (FTP TRANSFER HOST FILE LIST screen) of the hard disk of the host computer to enable file operation.

3.2 OPERATING THE FTP TRANSFER HOST FILE LIST SCREEN

Host computer files can be operated on the FTP TRANSFER HOST FILE LIST screen.



FTP TRANSFER HOST FILE LIST screen

> **NOTE**
> A file name containing a 2-byte code used for Japanese and others may not be displayed correctly.

Display item

CONNECT HOST

Displays the number of the host computer currently connected.

REGISTERED PROGRAM

The number of programs in the current folder.

DEVICE

Displays the current device. If the host file list of the Fast Ethernet is selected, "FTP_HOST" is indicated.

CURRENT FOLDER

Displays the work folder in the current host computer.

FILE LIST

Displays information about the files and folders in the host computer.

Operation list

DEVICE CHANGE

Enables a device for display on the PROGRAM FOLDER screen. When selecting the host file list of the Fast Ethernet, press soft key [FTP HOST].

DETAIL OFF / DETAIL ON
Switches the file list information to overall display or detail display.

CREATE FOLDER
Creates a sub-folder under the current work folder.

DELETE
Deletes a file or folder.

RENAME
Renames a file or folder.

HOST CHANGE
Changes the connected host computer.

SEARCH
Searches for a file in the current folder.

READ (For the Series 30*i*/31*i*/32*i*-A)
F INPUT (For the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)
When the CNC is placed in the EDIT mode and parameter No.20 is equal 5, it is possible to input NC programs in the host computer to program memory of the CNC.

PUNCH (For the Series 30*i*/31*i*/32*i*-A)
F OUTPUT (For the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)
When the CNC is placed in the EDIT mode and parameter No.20 is equal 5, it is possible to output NC programs in program memory of the CNC to the host computer.

REFRESH
Updates the information displayed on the FTP TRANSFER HOST FILE LIST screen of the Fast Ethernet.

3.2.1 Displaying and Operating the File List

RENAME, DETAIL OFF, DETAIL ON

The contents of the file list can be updated and displayed.

1 Press soft key [REFRESH] to update the contents of the file list.
2 Press soft key [DETAIL OFF] to display a file name only.
3 Press soft key [DETAIL ON] to display a file attribute, size, date, and file name.

NOTE
1 The information displayed with soft key [DETAIL ON] depends on the setting of the FTP server on the host computer.
2 When a file operation is performed in the detail display mode, the rightmost information displayed on the screen is handled as the file name. For this reason, the file operation may not be performed correctly depending on the displayed information or file name. In this case, set the overall display mode and perform the file operation.

MOVE FOLDER

A work folder can be moved.

1 By using cursor keys [↓] [↑], select a folder to be moved.

2 Press the MDI key [INPUT].

CREATE FOLDER

A new folder can be created.

1 Move to a new folder to be created.
2 Enter a desired folder name.
3 Press soft key [CREATE FOLDER].

DELETE

Specifying a file or folder

A file or folder can be deleted.

1 By using cursor keys [↓] [↑], select a file or folder to be deleted.

2 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Specifying multiple files

Multiple files or folder can be deleted.

1 Press soft key [SELECT START].

2 By using cursor keys [↓] [↑], select a file to be deleted.

3 Press soft key [SELECT].
A selected file is displayed in reverse video.
Repeat steps 2 and 3 for files to be deleted.

4 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
Up to 10 files can be selected at a time.

DELETE (new method)

Specifying a file or folder

A file or folder can be deleted.

1 Place the cursor on the name of a file or folder to be deleted.
2 Press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Selecting a range

Multiple files or folders can be deleted.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be deleted and press soft key [RANGE SELECT].
3 By using cursor keys [↓] [↑], select a range of files to be deleted.
A selected file is displayed in reverse video.
4 When you have selected a desired range, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

Selecting individual files or folders

Multiple files or folders can be deleted.

1 Press soft key [SELECT].
2 Place the cursor on the name of a file to be deleted and press soft key [SELECT].
A selected file is displayed in reverse video.
3 Repeat step 2 for all files to be selected.
4 When you have selected desired files, press soft key [DELETE].
- Press soft key [EXEC] for execution.
- Press soft key [CANCEL] for cancellation.

NOTE
1 Delete operation of the new specification is performed when bit 3 (PCP) of parameter No. 11374 is set to 1 for the Series 30*i*/31*i*/32*i*-A or bit 4 (PCB) of parameter No. 11374 is set to 0 for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Seires 0*i*-F.
2 Up to 10 files can be selected at a time.

RENAME

A file or folder can be renamed.

1 By using cursor keys [↓] [↑], select a file or folder to be renamed.
2 Key a new file name or folder name.
3 Press soft key [RENAME].

SEARCH

In the current work folder, a file can be found.

1 Enter a desired file name.
2 Press soft key [SEARCH],

HOST CHANGE

The connected host computer can be changed.

1 Press soft key [HOST CHANGE].
The connected host number changes in the order 1 → 2 → 3 → 1.

3.3 NC PROGRAM INPUT

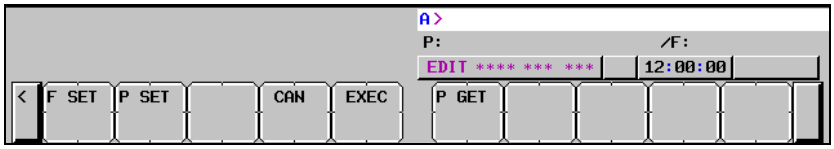
NC programs in the host computer can be input to program memory of the CNC.

> ⚠ **CAUTION**
> If bit 2 of parameter No. 3201 is set to 1, when an NC program having the same file name as an NC program to be input is already present in program memory, the existing NC program is overwritten.

> **NOTE**
> NC programs cannot be input simultaneously with an NC program output.

Procedure

1 Place the CNC in the EDIT mode.
2 Display the PROGRAM screen, PROGRAM FOLDER screen or FTP TRANSFER HOST LIST screen.
3 Press soft key [READ] ([F INPUT] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F).
4 In the key-in buffer, enter the name of a file to be input on the host computer, and press soft key [F SET]. When the file name on the host computer is not set, file name "ALL-PROG.TXT" is used by default.
5 To rename the input file and input it into program memory, enter the new file name in the key-in buffer, and press soft key [P SET].
6 Press soft key [EXEC].
7 During inputting, "INPUT" blinks in the lower right part of the screen.



3.4 NC PROGRAM OUTPUT

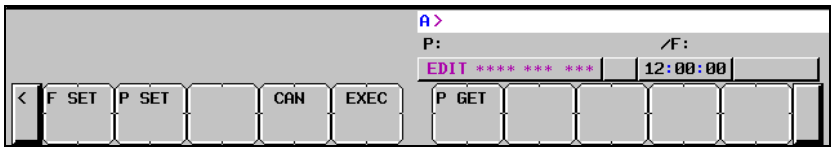
NC programs in program memory of the CNC can be output to the host computer.

> **NOTE**
> NC programs cannot be output simultaneously with an NC program input.

Procedure

1 Place the CNC in the EDIT mode.
2 Display the PROGRAM screen, PROGRAM FOLDER screen or FTP TRANSFER HOST LIST screen.
3 Press soft key [PUNCH] ([F OUTPUT] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F).
4 In the key-in buffer, enter the name of a file to be output in program memory, and press soft key [P SET].
When a specific file name in program memory is not set, all files in the foreground folder are assumed to be output.
5 To rename the output file and output it to the host computer, enter the new file name in the key-in buffer, and press soft key [F SET].
When only a file in program memory is specified, but no file name on the host computer is specified, a file is created with the file name used in program memory.

6 Press soft key [EXEC].
7 During outputting, "OUTPUT" blinks in the lower right part of the screen.



NOTE

When neither file in program memory nor file name on the host computer is specified, all files in the foreground folder are output with file name "ALL-PROG.TXT" to the host computer.

V. CONNECTION

1 SETTING

This chapter provides information required to install a hardware option.

1.1 Series 30*i*/31*i*/32*i*-A

1.1.1 Specifications

Ordering information of Fast Ethernet board	A02B-0303-J146
Drawing number of printed circuit board	A20B-8101-0030
Applicable models	Series 30*i*/31*i*/32*i*-A

NOTE
1 When using the Fast Ethernet board, observe the installation condition (environmental condition inside the cabinet) of the CNC control unit where the board is installed.
2 Even if a control unit is installed in the environment described above, the contents on the memory card may be destroyed as a result of a operation mistake or unexpected event. This tends to happen if the power is turned off while accessing the memory card. An accident can occur. So, ensure that the data on the memory card is backed up at all times.

The table below indicates the amount of heat output by the Fast Ethernet/Fast Data Server. For the amount of heat output by the main CNC unit and other optional units, refer to the CONNECTION MANUAL (HARDWARE) of the CNC.

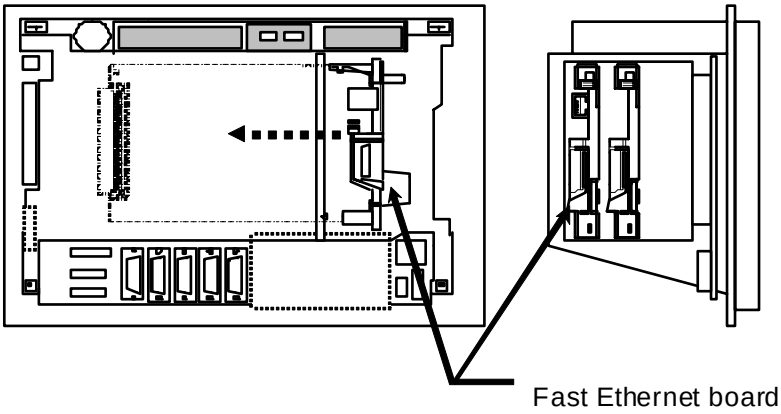
Name	Fast Ethernet	Fast Data Server
Fast Ethernet board only	6 W	6 W
Memory card	-	0.3 W (Note)
Total	6 W	6.3 W

NOTE
The amount of heat output by the memory card may vary, depending on the employment of a large-capacity card, a modification to the card specifications, and so forth.

1.1.2 Installation

1.1.2.1 Installation on an LCD-mounted type unit

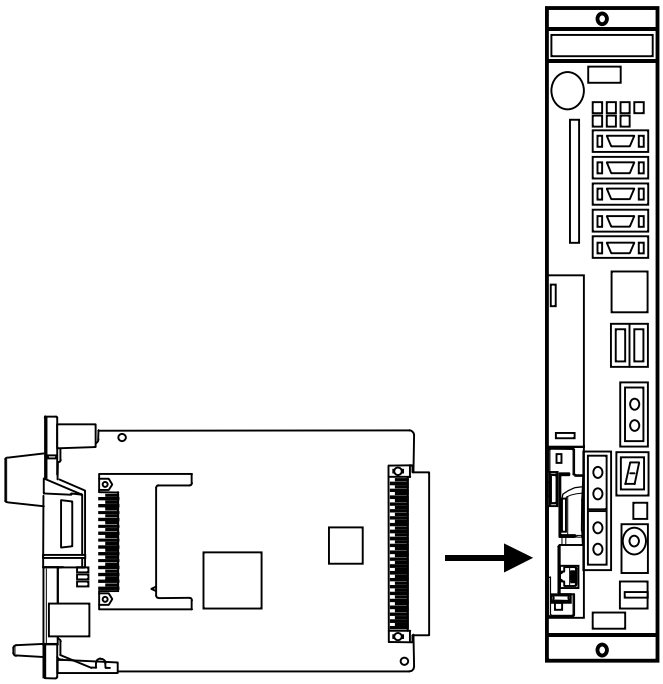
The Fast Ethernet board is installed in an optional slot of the control unit. It occupies one slot. No restriction is imposed on installation in the optional slot.



NOTE
1 When using the Data Server functions, install a memory card in CNH6 before installing the board in the optional slot. While the board is installed in the optional slot, the memory card cannot be installed/removed.
2 Use the memory card recommended by FANUC.

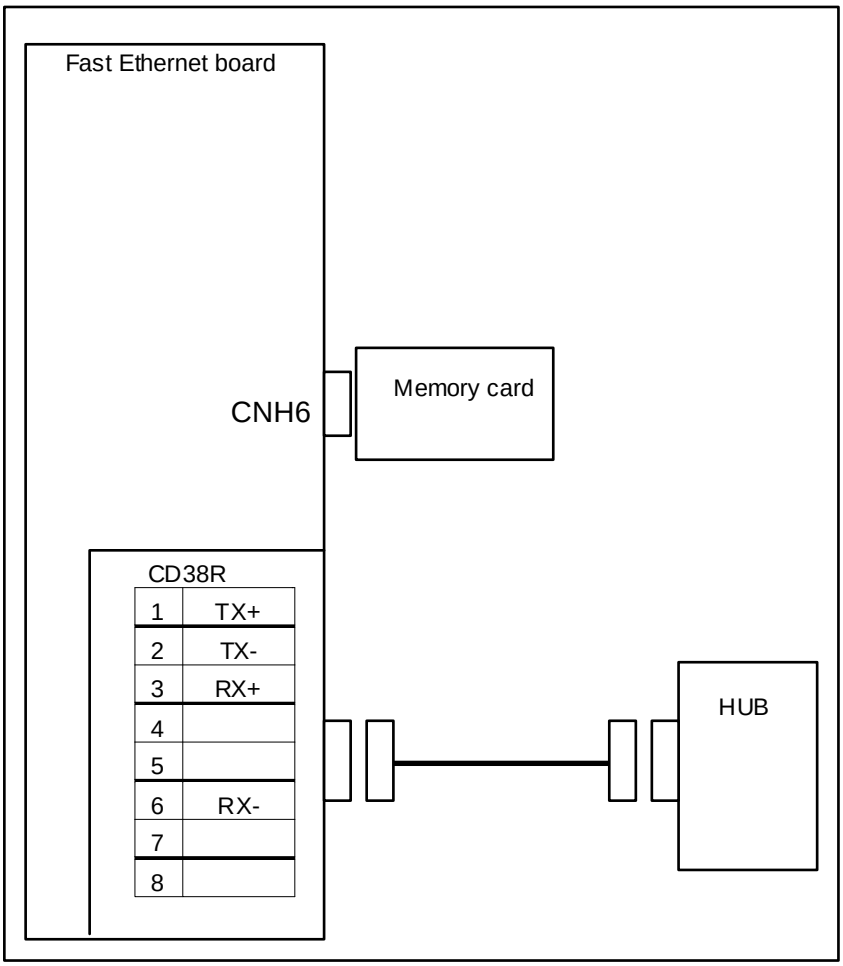
1.1.2.2 Installation on a stand-alone type unit

The Fast Ethernet board is installed in the optional slot of the control unit. One slot is occupied. No restriction is imposed on installation in the optional slot.



NOTE
1 When using the Data Server functions, install a memory card in CNH6 before installing the board in the optional slot. While the board is installed in the optional slot, the memory card cannot be installed/removed.
2 Use the memory card recommended by FANUC.

1.1.2.3 Total connection diagram



1.1.2.4 Installing a memory card

The following shows the specifications of memory cards recommended as an external storage device of the Fast Ethernet board.

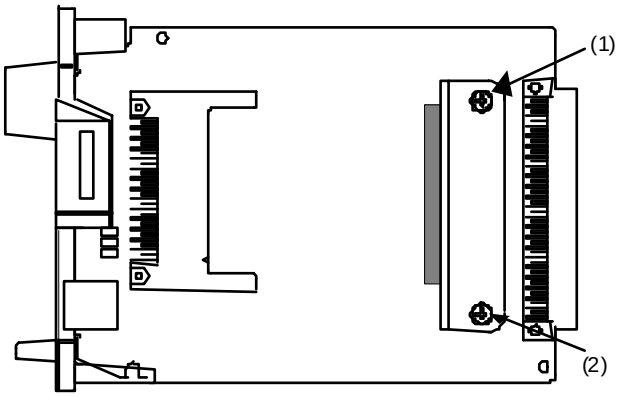
Specification	Capacity	Remarks
A02B-0281-K601	128MB	Compact Flash card
A02B-0213-K211	256MB	Compact Flash card
A02B-0213-K212	1GB	Compact Flash card
A02B-0213-K213	2GB	Compact Flash card
A02B-0213-K214	4GB	Compact Flash card

For adapters that convert data on the above Compact Flash cards to that for an ATA card, the operation of the following adapters has been confirmed: FANUC adapter A02B-0236-K150 and Sandisk adapters SDCF-31-03 and SDAD-38-J60.

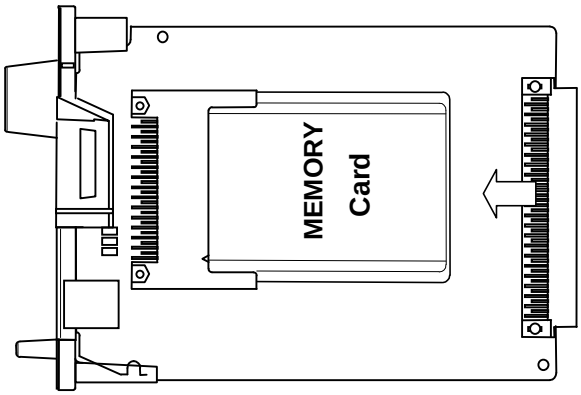
NOTE
1 Use a FANUC-recommended memory card for the Data Server.
Follow the instructions described in “Note for using this card” supplied with a memory card.
2 For latest information, refer to the Technical Report provided separately.

Installing a memory card

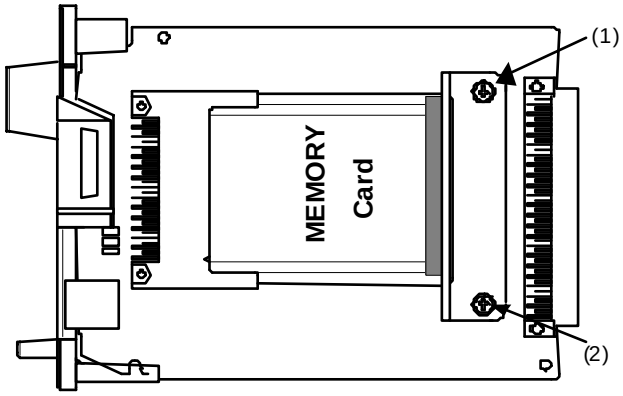
1 Remove the screws of (1) and (2) for securing the stopper plate.



2 Remove the stopper plate, then insert the memory card into the connector.



3 Secure the memory card with the stopper plate and tighten the screws of (1) and (2) for securing the stopper plate.



1.2 Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A AND Series 0*i*-F

1.2.1 Specifications

In case of using the Ethernet function, specify the control unit with Multi-function Ethernet (LCD-mounted type CNC) or the Fast Ethernet board.
In case of using the Data Server function, specify the Fast Ethernet board.

Ordering information of Fast Ethernet board	A02B-0323-J147	Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A
	A02B-0338-J147	Series 0*i*-F
Drawing number of printed circuit board	A20B-8101-0770	
Applicable models	Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, and Series 0*i*-F	

NOTE
1 Refer to the order list of each CNC, for ordering information for Multi-function Ethernet. In case of Series 0i-F (LCD mounted type CNC), Multi-function Ethernet cannot be used.
2 When using the optional board, observe the installation condition (environmental condition inside the cabinet) of the CNC control unit where the board is installed.
3 Even if a control unit is installed in the environment described above, the contents on the Compact Flash card may be destroyed as a result of a operation mistake or unexpected event. This tends to happen if the power is turned off while accessing the Compact Flash card. An accident can occur. So, ensure that the data on the Compact Flash card is backed up at all times.

The table below indicates the amount of heat output by the Fast Ethernet/Fast Data Server. For the amount of heat output by the main CNC unit and other optional units, refer to the CONNECTION MANUAL (HARDWARE) of the CNC.

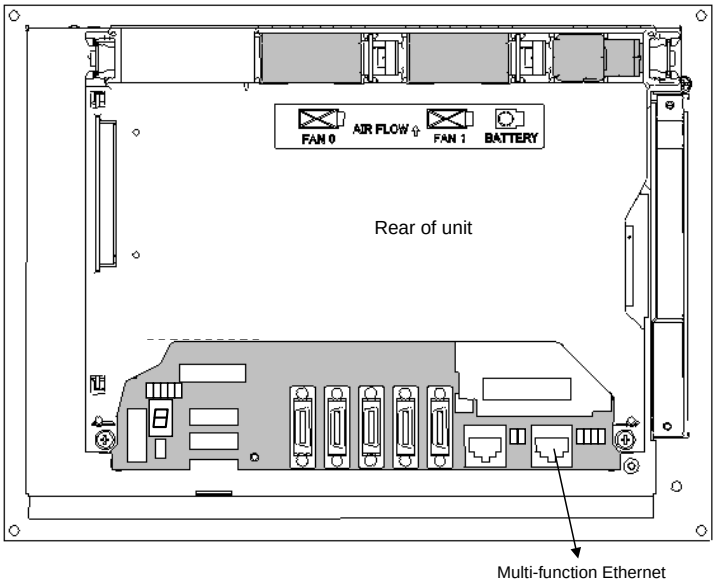
Name	Fast Ethernet	Fast Data Server
Fast Ethernet board only	3W	3W
Compact Flash card	–	0.3W (Note 2)
Total	3W	3.3W

NOTE
1 For the control unit with Multi-function Ethernet (LCD mounted type CNC), refer to the CONNECTION MANUAL of the CNC.
2 The amount of heat output by the Compact Flash card may vary, depending on the employment of a large-capacity card, a modification to the card specifications, and so forth.

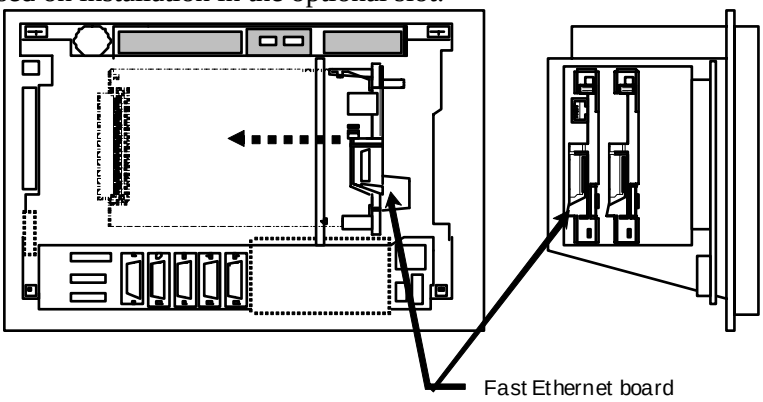
1.2.2 Installation

1.2.2.1 Installation on an LCD-mounted type unit

For the control unit with Multi-function Ethernet, the printed circuit board of Fast Ethernet is installed on the main board.



The Fast Ethernet board is installed in an optional slot of the control unit. It occupies one slot. No restriction is imposed on installation in the optional slot.



NOTE

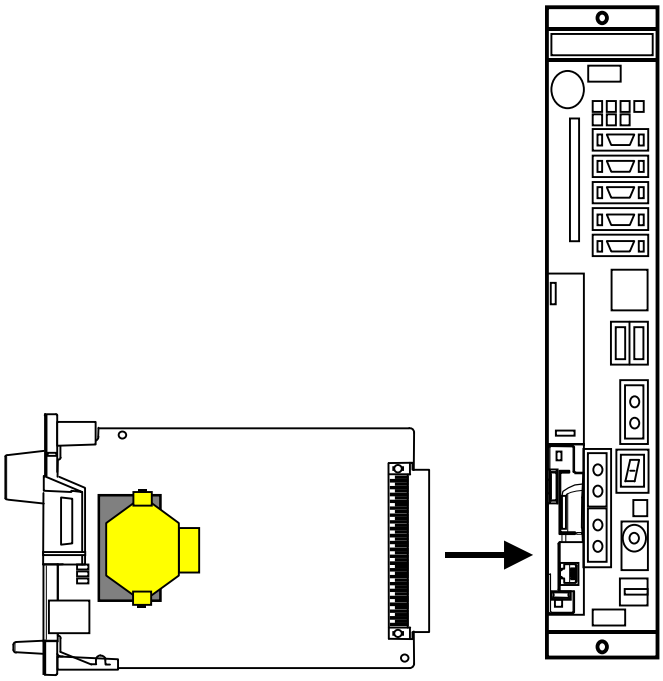
1 When using the Data Server functions, install a Compact Flash card in CD58 before installing the board in the optional slot. While the board is installed in the optional slot, the Compact Flash card cannot be installed/removed.

2 For the Data Server for the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F directly install a Compact Flash card.
It is not necessary to use an adapter which converts data for that for an ATA card (A02B-0236-K150).

3 Use the Compact Flash card recommended by FANUC.

1.2.2.2 Installation on a stand-alone type unit

The Fast Ethernet board is installed in the optional slot of the control unit. One slot is occupied. No restriction is imposed on installation in the optional slot.



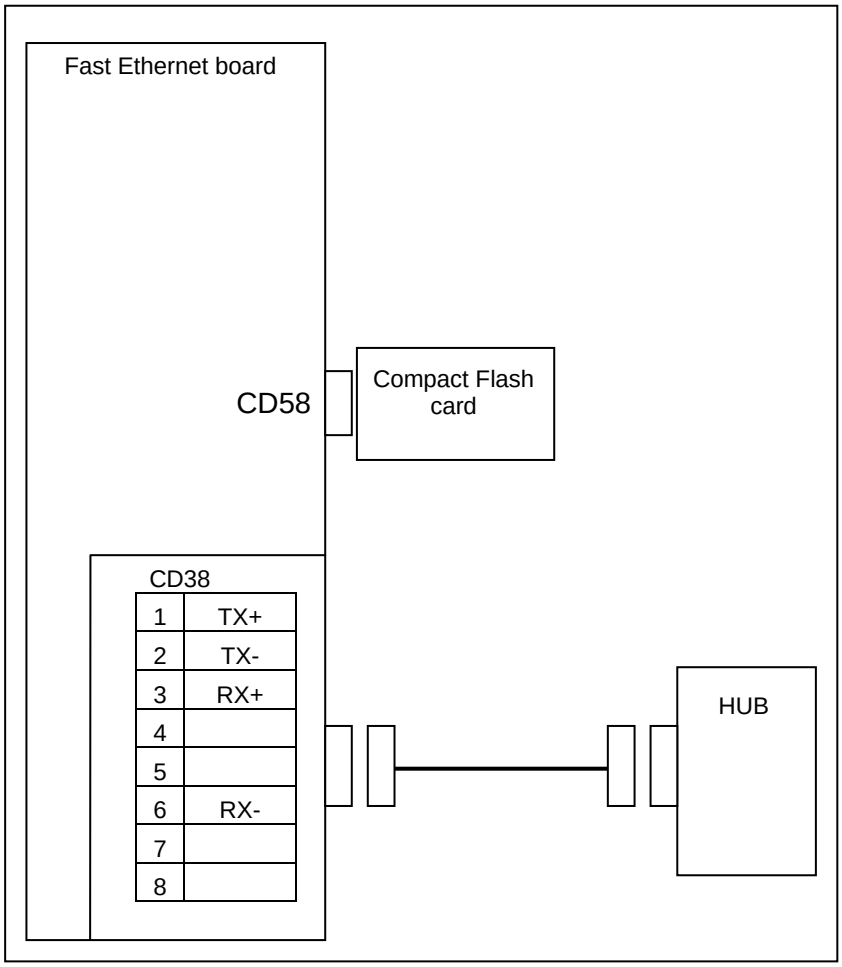
NOTE

1 When using the Data Server functions, install a Compact Flash card in CD58 before installing the board in the optional slot. While the board is installed in the optional slot, the Compact Flash card cannot be installed/removed.

2 For the Data Server for the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F directly install a Compact Flash card.
It is not necessary to use an adapter which converts data for that for an ATA card (A02B-0236-K150).

3 Use the Compact Flash card recommended by FANUC.

1.2.2.3 Total connection diagram



1.2.2.4 Installing a memory card

The following shows the specifications of memory cards recommended as an external storage device of the Fast Ethernet board.

Specification	Capacity	Remarks
A02B-0281-K601	128MB	Compact Flash card
A02B-0213-K211	256MB	Compact Flash card
A02B-0213-K212	1GB	Compact Flash card
A02B-0213-K213	2GB	Compact Flash card
A02B-0213-K214	4GB	Compact Flash card
A02B-0213-K216	16GB	Compact Flash card

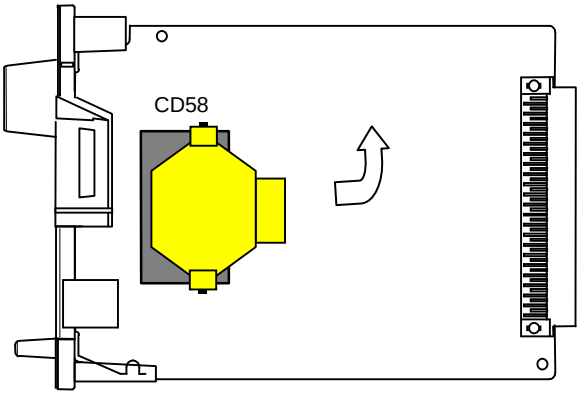
NOTE

1 Use a FANUC-recommended memory card for the Data Server.
Follow the instructions described in “Note for using this card” supplied with a memory card.

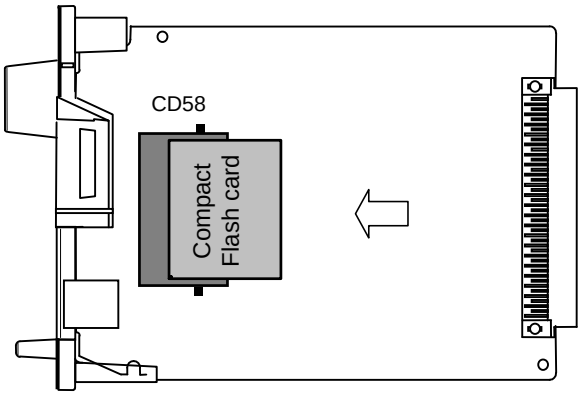
2 For latest information, refer to the Technical Report provided separately.

Installing a Compact Flash card

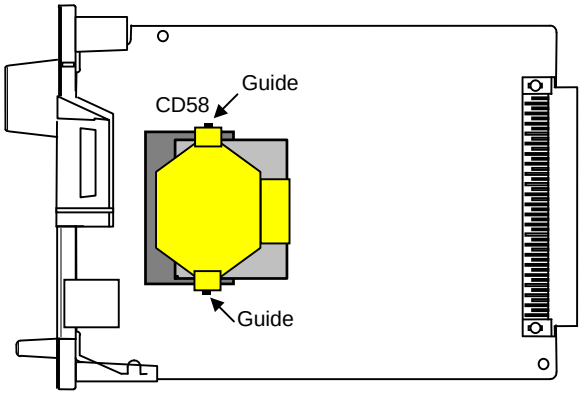
1 Remove the cover (put up the tip of cover), as shown below.



2 Insert the Compact Flash card to CD58.



3 The cover is matched to the guide and set on. As a result, the Compact Flash card is fixed.



2 CABLE CONNECTION

This section describes information relating to the physical Ethernet connection.

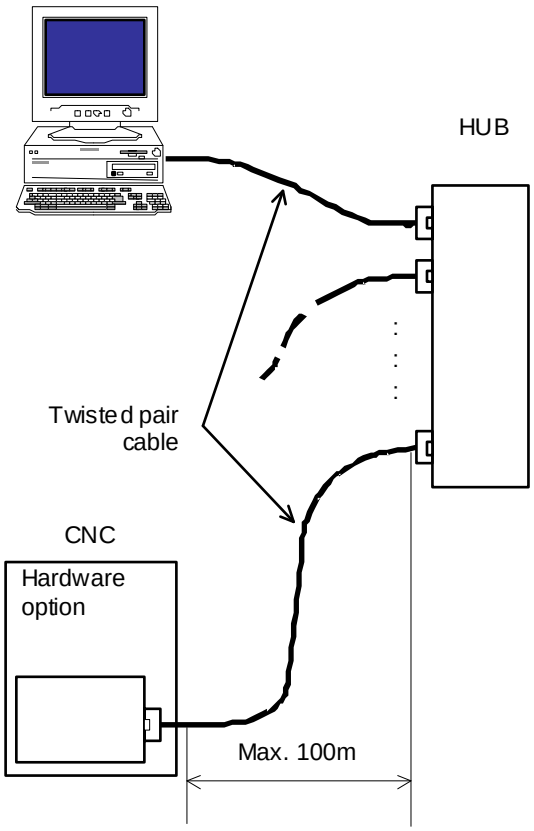
⚠ CAUTION

1 Before connecting or disconnecting the cable to or from the hardware option, make sure that the power to the CNC is turned off.

2 Please inquire of each manufacturer about the construction of network or the condition of using the equipment except the hardware option (hub, transceiver, cable etc.). When configuring your network, you must take other sources of electrical noise into consideration to prevent your network from being influenced by electrical noise. Make sure that network wiring is sufficiently separated from power lines and other sources of electrical noise such as motors, and ground each of the devices as necessary. Also, a high and insufficient ground impedance may cause interference during communications. After installing the machine, conduct a communications test before you actually start operating the machine.
We cannot ensure operation that is influenced by network trouble caused by a device other than the hardware option.

2.1 CONNECTING TO Ethernet

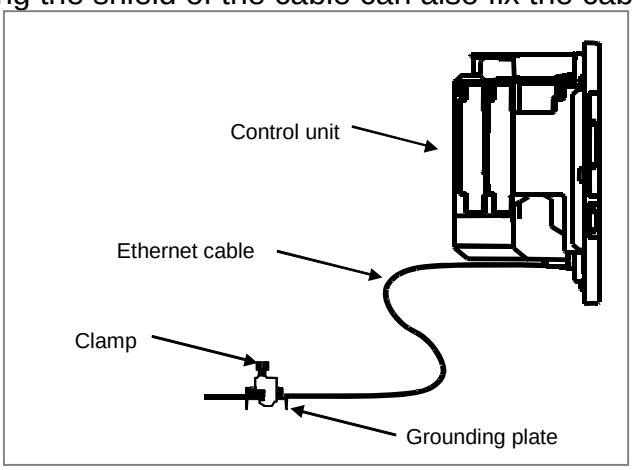
The Fast Ethernet or hardware option is provided with a 100BASE-TX interface.
Prepare a hub for connecting the Fast Ethernet board to the Ethernet trunk. The following shows an example of a general connection.



NOTE

1 The cable can be up to 100 m long (for the FANUC- recommended cable for movable sections, up to 50 m). Do not make the cable longer than necessary.

2 An Ethernet cable needs clamping to make system operation stable. For details of clamping, see Subsection 2.5.2, “Cable Clamp and Shield Processing”. The clamp for grounding the shield of the cable can also fix the cable.

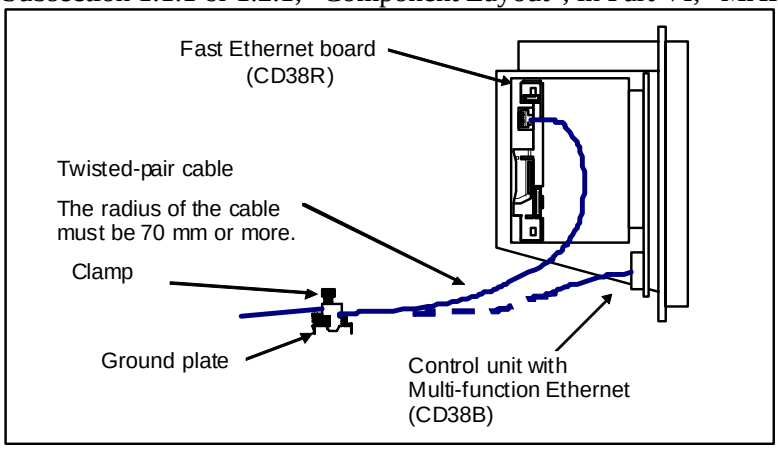


3 Some of the units (hub, transceiver, etc.) required to build a network are not dust-proof. They should be enclosed in a dust-proof cabinet. Using them in an atmosphere with dust or oil mist may lead to a communication error or failure.

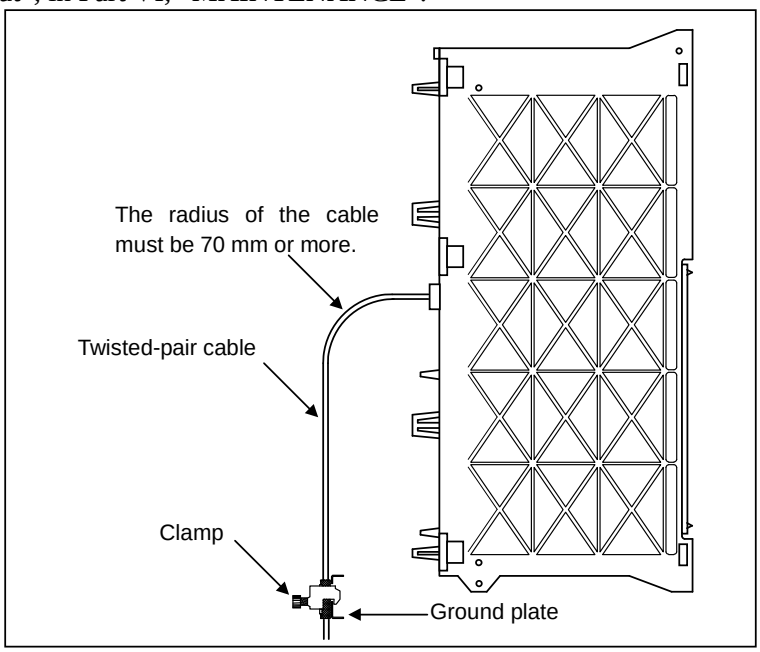
2.2 LEADING OUT THE Ethernet CABLE

(1) LCD-mounted type

Select the control unit with Multi-function Ethernet or Fast Ethernet board. For the location of the connector, see Subsection 1.1.1 or 1.2.1, “Component Layout”, in Part VI, “MAINTENANCE”.



(2) Stand-alone type
Select the Fast Ethernet board. For the location of the connector, see Subsection 1.1.1 or 1.2.1, “Component Layout”, in Part VI, “MAINTENANCE”.



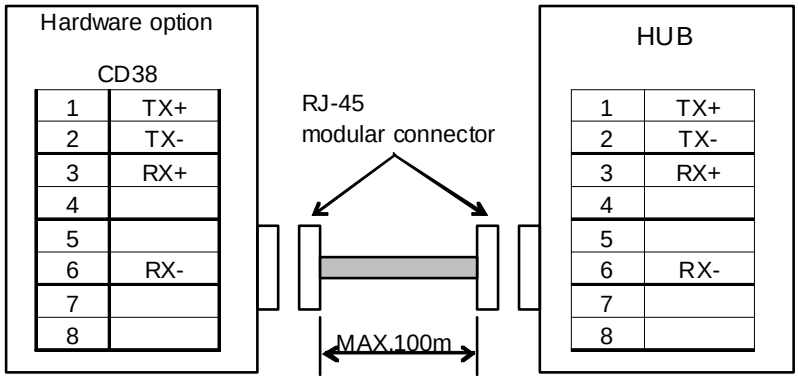
2.3 RJ-45 CONNECTOR PIN ASSIGNMENTS

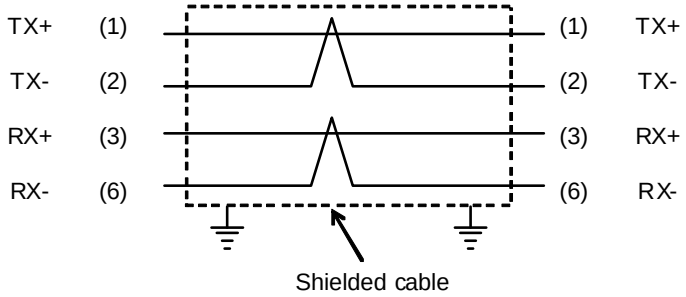
Pin No.	Signal name	Description
1	TX+	Send +
2	TX-	Send -
3	RX+	Receive +
4		Not used
5		Not used
6	RX-	Receive -
7		Not used
8		Not used

2.4 TWISTED-PAIR CABLE SPECIFICATION

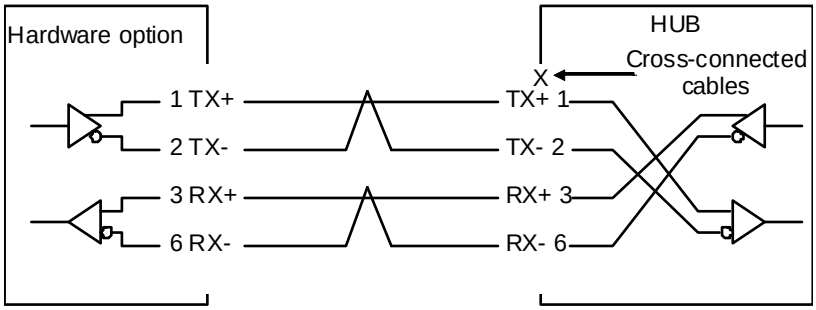
2.4.1 Cable Connection

The cable used for connection between the 100BASE-TX interface, CD38R, of the Ethernet board/Data Server board and the hub is connected as follows:





- Keep the total cable length within 100 m.
  Do not extend the cable more than is necessary.
- The figure above shows the cable connection when cables are crossed in the hub.
  "X" is usually indicated at the port of the hub to signify that cables are crossed in the hub.



2.4.2 Cable Materials

> ⚠ **CAUTION**
> Unshielded cable (UTP cable) is commercially available as 100BASE-TX twisted-pair cable: You should, however, use shielded Category 5 twisted-pair cable (STP cable) to improve the resistance to electrical noise in an FA environment.

Recommended cables

Manufacturer	Specification	Remarks
FURUKAWA ELECTRIC CO., LTD.	DTS5087C-4P	Twisted-pair cable

Manufacturer	Specification	Remarks
NISSEI ELECTRIC CO., LTD.	F-4PFWMF	Single-conductor cable

Inquiries

Manufacturer	Contact address
FURUKAWA ELECTRIC CO., LTD. Sales Headquarters	2-6-1 Marunouchi, Chiyoda-ku. Tokyo 100-8322 TEL: 03-3286-3126 FAX: 03-3286-3979
Remarks	
NISSEI ELECTRIC CO., LTD. Machida Branch	3F MU Bldg., 1-9-1 Minami-narise, Machida City, Tokyo 194-0045 TEL: 0427-29-2531 FAX: 0427-29-3375
Overseas Sales Office	IWATANI International Corporation Tokyo Head Office 21-8 Nishi-shinbashi 3-chome, Minato-ku, TOKYO, 105-8458, JAPAN TEL: 03-5405-5810 FAX: 03-5405-5666 Telex: 2524256 IWATYO J
Remarks	A finished cable with connectors at both ends can be offered.

NOTE
The above recommended cables cannot be connected to moving parts.

Recommended cable (for movable parts)

Manufacturer	Specification	Remarks
Oki Electric Cable Co., Ltd.	AWG26 4P TPMC-C5-F(SB)	Dedicated to FANUC
Shinko Electric Industrial Co., Ltd.	FNC-118	

Specification

- Electric characteristics:
  Conforms to EIA/TIA 568A Category 3 and Category 5.
  From the viewpoint of attenuation performance, ensure that the length to the hub is 50 m or less.
- Structure:
  Group shielded (braided shield). A drain wire is available.
  The conductor is an AWG26 annealed copper twisted wire, with a sheath thickness of 0.8 mm and an outer diameter of 6.7 mm ±0.3 mm.
- Fire retardancy
  UL1581 VW-1
- Oil resistance
  Conforms to the FANUC internal standards (equivalent to the conventional oil-resistant electric cables).
- Flexing resistance:
  1,000,000 times or more with a bending radius of 50 mm (U-shaped flex test)
- UL style No.
  AWM 20276 (80°C/30V/VW-1)

NOTE
Be sure to use the connector TM21CP-88P(03) manufactured by HIROSE ELECTRIC CO., LTD. for this cable.

Inquiries

Manufacturer	Contact address	Remarks
Oki Electric Cable Co., Ltd.	Nagano Sales Office TEL:0266-27-1597	
Shinko Electric Industrial Co., Ltd.	Tokyo Sales Office TEL:03-3492-0073	

Cable assembly

Oki Electric Cable Co., Ltd. can also supply the cable assembly mentioned above.
Contact Oki Electric directly to determine the specifications (length, factory test, packing, and so forth) for purchase.

2.4.3 Connector Specification

Use an 8-pin modular connector (RJ-45) with the twisted-pair cable for the Ethernet connection. The following connector must be used.

Specification	Manufacturer	Remarks
TM21CP-88P(03)	HIROSE ELECTRIC CO., LTD.	Note

NOTE

Information about TM21CP-88P(03):
Connector (standard product of the manufacturer)
Drawing number: A63L-0001-0823#P
Manufacturer: HIROSE ELECTRIC CO., LTD.
Manufacturer type number: TM21CP-88P(03)
Conforms to EIA/TIA 568A Category 3 and Category 5.
For assembly with a cable, contact HIROSE ELECTRIC CO., LTD. directly.
(From HIROSE ELECTRIC CO., LTD., "TM21CP-88P(03) Connection Procedure Manual (Technical Specification No. ATAD-E2367)" is available as a technical document.)

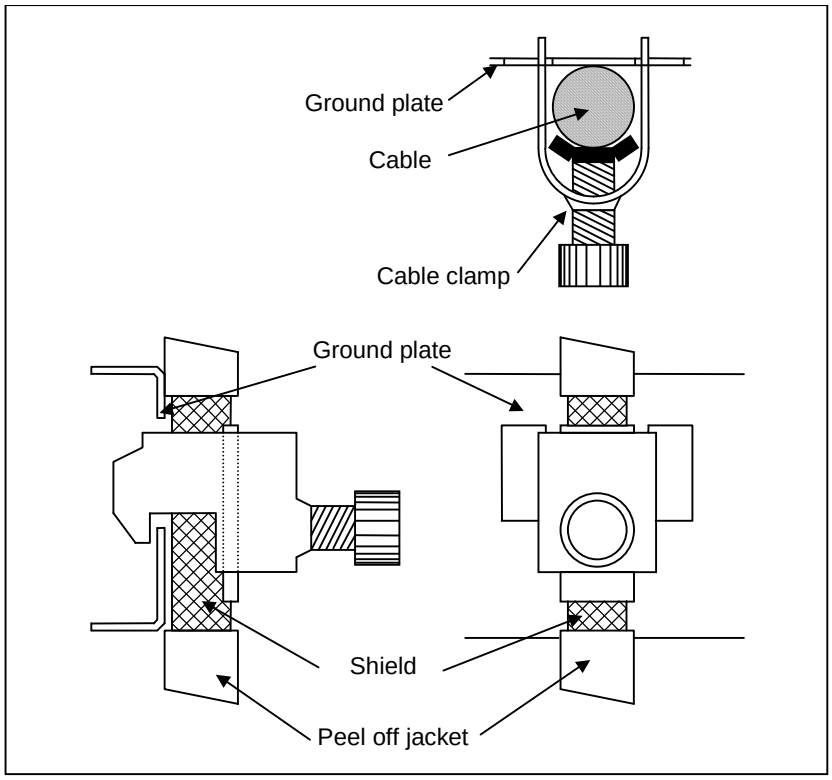
2.5 ELECTRICAL NOISE COUNTERMEASURES

2.5.1 Separating Signal Lines

For signal line separation, refer to the description of noise protection in the Connection Manual (Hardware) of CNC. The wiring for the Ethernet cable is of group C.

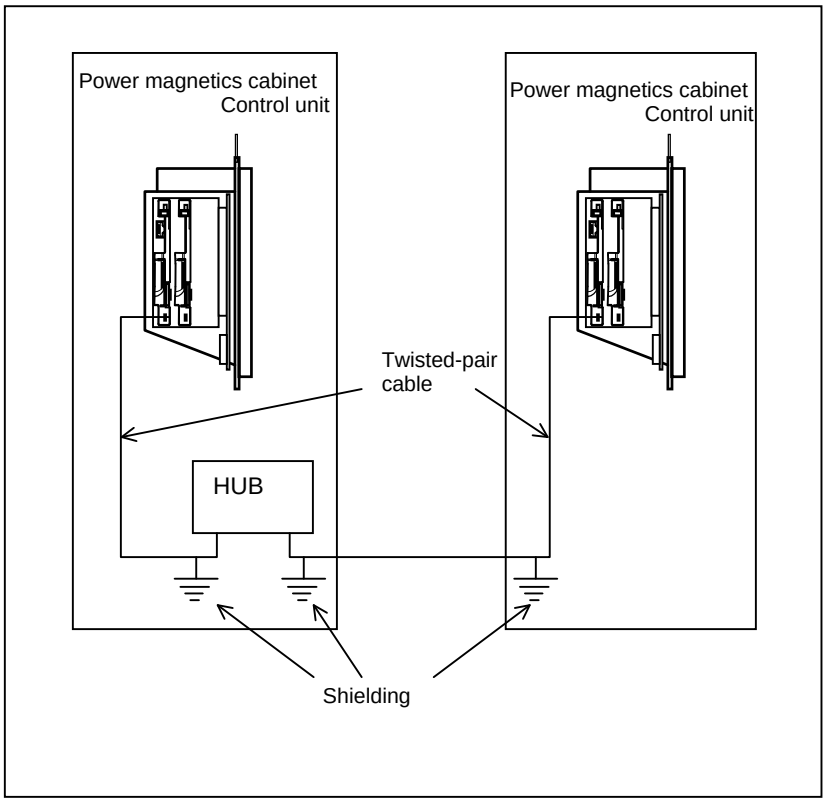
2.5.2 Clamping and Shielding Cables

Clamp an Ethernet twisted pair cable according to the method described below, as with cables that need to be shielded. Clamping cables provides support and shielding and is extremely important to the safe operation of the system. Never overlook cable clamping.
Peel off part of the jacket as shown in the figure to expose the outer coating of the shield, and press this outer coating against the ground plate with the clamp fixture.
The machine manufacturer must prepare the ground plate and install it as follows:



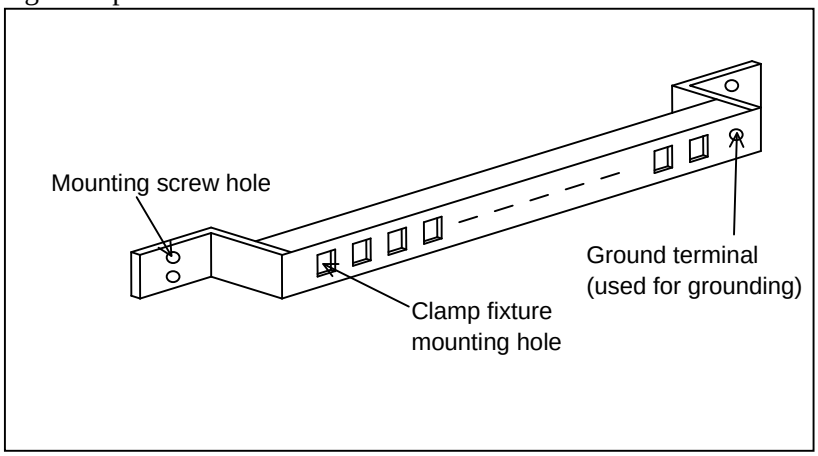
NOTE
To ensure the safe operation of the system, clamp and shield the cables.

Connect the Ethernet board and hub with a twisted-pair cable. Shield the cable with clamp fixtures.
This shielding is extremely important to the stable operation of the system. Be sure to shield the cable. Shield both ends of each cable at locations as nearest to the CNC and hub connectors as possible. When the CNC and hub are contained in the same power magnetics cabinet and the cable is short, shield the cable only at the hub side.

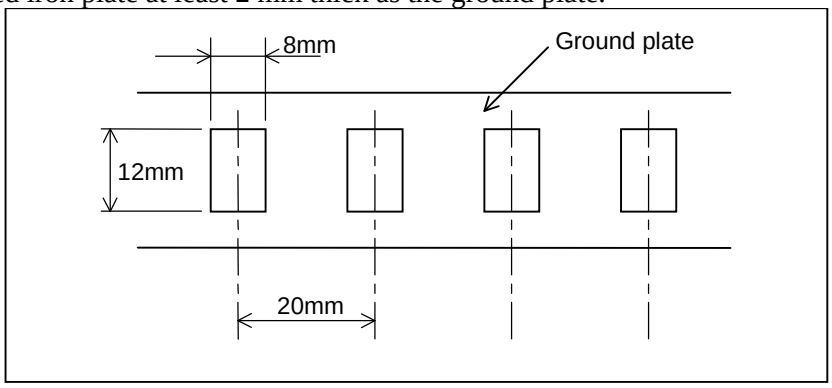


Example of shielding of transceiver cable
(When LCD-mounted type Series 30*i*-A)

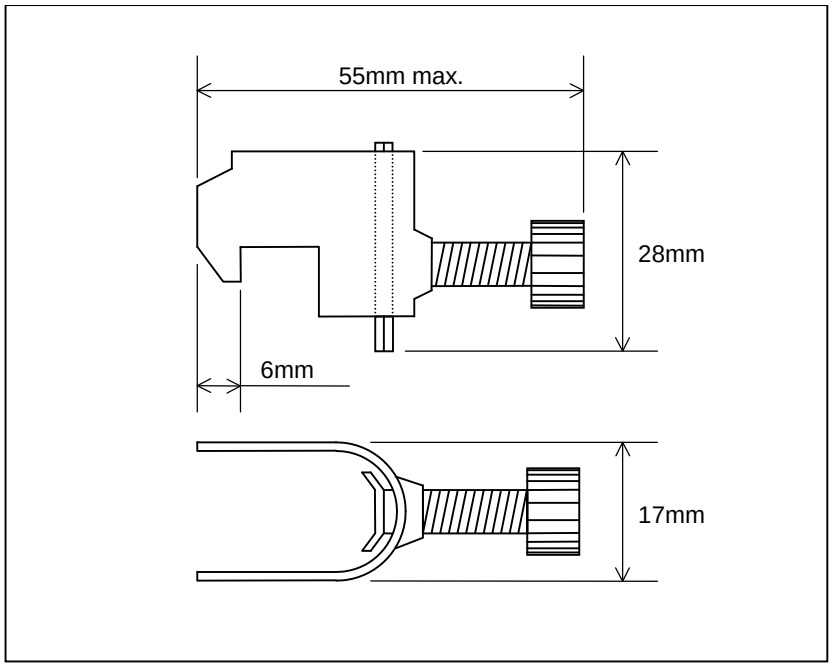
Prepare the following earth plate.



Use a nickel-plated iron plate at least 2 mm thick as the ground plate.



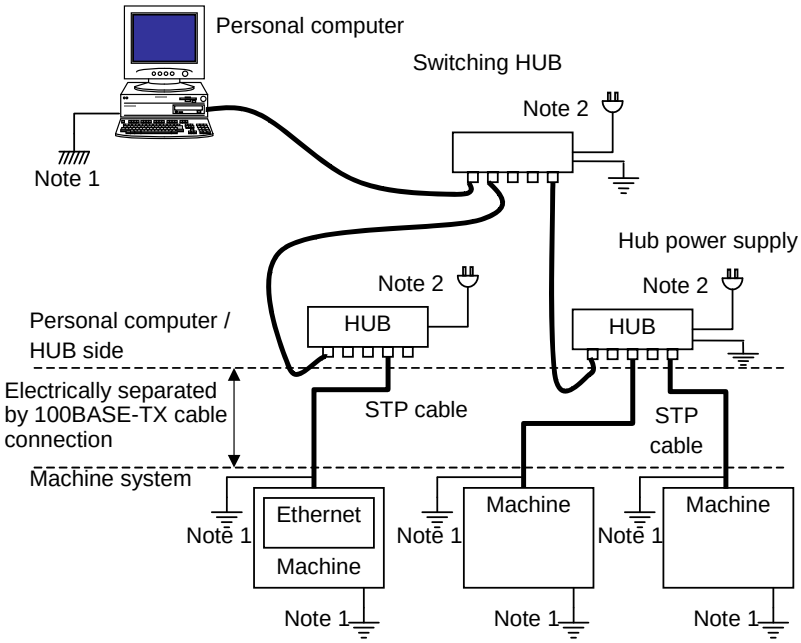
Details of clamp fixture mounting holes



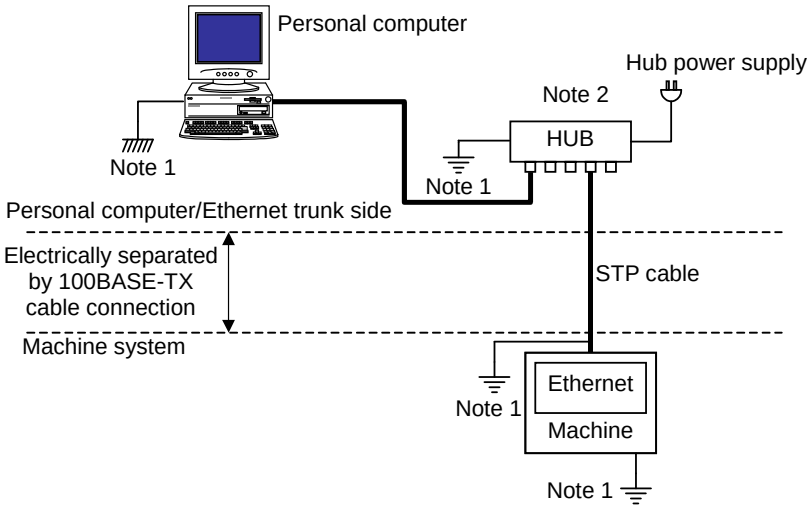
External dimensions of clamp fixture

2.5.3 Grounding the Network

Even if the grounding condition on the machine side is satisfied, the communication line can pick up noise from the machine, depending on the machine installation condition and environment, thus resulting in a communication error. To protect against such noise, the machine should be separated and insulated from the Ethernet trunk cable and personal computer. Examples of connection are given below.



Large-Scale Network



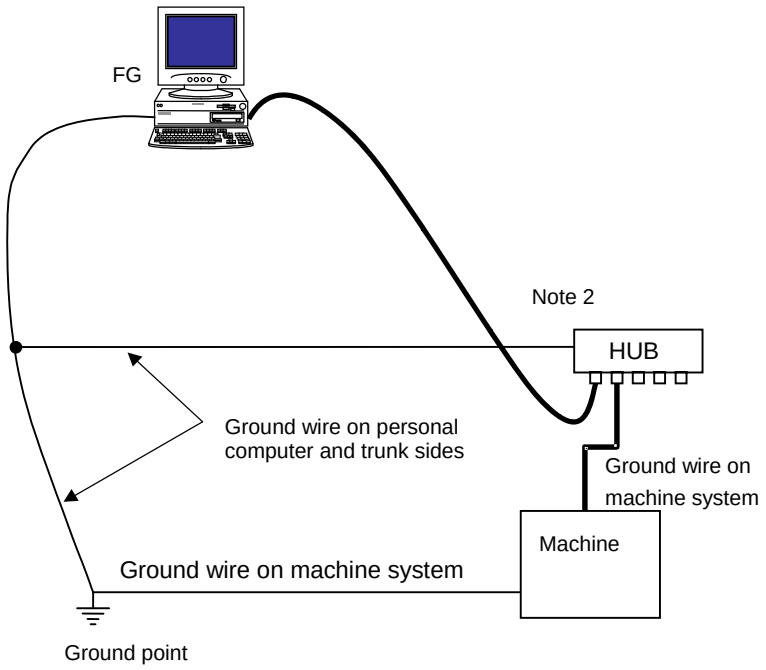
Small-Scale Network

NOTE

1 The ground between PC/HUB side and machine system side must be separated. If it is impossible to separate the ground because there is only one grounding point, connect the ground cable for each system to the grounding point independently. (See figure below.)
The resistance for grounding must be less than 100-ohm (Class D). The thickness of the ground cable is the same as the thickness of AC power cable or more. At least thickness of 5.5mm^2 is necessary.

2 Note that the number of allowable hub-to-hub connections depends on the type of hub.

3 There is possibility that noise makes the obstacle of communication even if the ground is separated using the 100BASE-TX. In the case of using the Fast Ethernet/Fast Data Server under the worst environment, please separate between the PC/Trunk line side and machine system side completely using the 100BASE-FX (Optical fiber media).



Wiring on a single ground point

2.6 CHECK ITEMS AT INSTALLATION

The following table lists check items at installation.

Check item		Description	Check
Ethernet cable			
	Type	Use cables which satisfies all the following conditions:	
		1) With shielding	
		2) Twisted-pair cable	
		3) Category 5	
	Length	The cable length shall be within 100 m (50 m for a movable cable recommended by FANUC).	
	Connection	For a twisted-pair cable, the following pins shall be paired:	
		1) Pin No. 1 (TX+) – pin No. 2 (TX-)	
		2) Pin No. 3 (RX+) – pin No. 6 (RX-)	
	Separation	The Ethernet cables shall be bound separately from the following cables or covered with an electromagnetic shield:	
		1) Group A: AC power lines, power lines for motors, and others	
		2) Group B: DC power lines (24 VDC) and others	
	Shielding	For a shielded cable, the part of which outer coating is peeled off and exposed shall be fixed to the ground plate with a clamp fixture.	
	Clamping	The ground plate shall be located as nearest to the CNC as possible (to make the cable between the ground plate and CNC hard to be affected by noise).	
	Connectors	Any cable connector shall not be pulled (to prevent poor contact of the connector).	
	Wiring	No cable shall be laid under a heavy object.	
	Bending radius	The bending radius shall be at least four times as long as the diameter of the cable.	
	For movable part	For a movable part, a cable for a movable part shall be used.	

Check item		Description	Check
CNC and cabinet			
	CNC grounding	The CNC ground (frame ground) shall be connected properly and the length of the ground wire shall be within 300 mm.	
	Mounting	The Fast Ethernet board shall be inserted in a CNC slot properly.	
HUB			
	Use conditions	The "cautions on use" of the hub shall be observed (A terminating resistor shall be mounted properly if required).	
	Grounding	The hub shall be grounded.	
	Cabinet	The hub shall be installed in an enclosed cabinet.	
	Vibration	The hub shall be installed so that it is not affected by vibration.	
	Bending radius	The bending radius shall be at least four times as long as the diameter of the cable.	

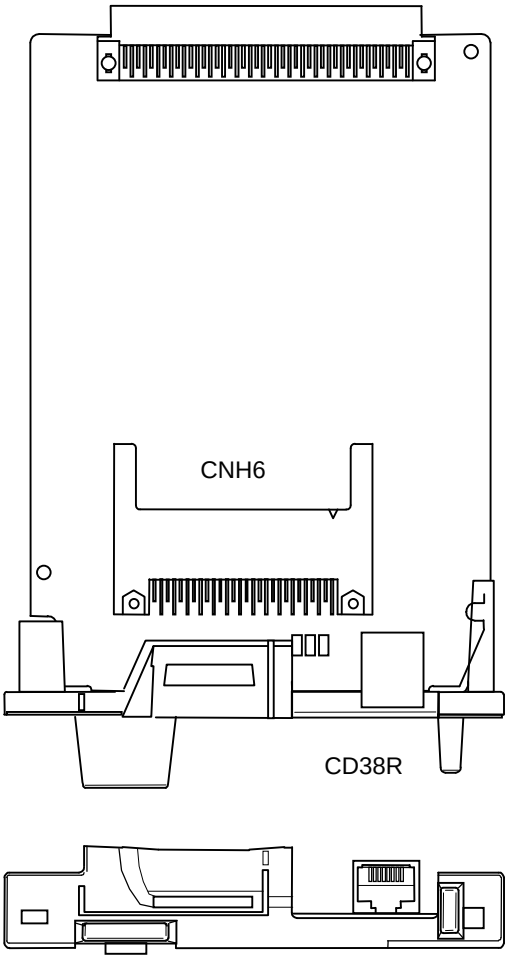
VI. MAINTENANCE

1 HARDWARE MAINTENANCE INFORMATION

This chapter provides hardware maintenance information related to the Fast Ethernet/Fast Data Server.

1.1 Series 30*i*/31*i*/32*i*-A

1.1.1 Component Layout

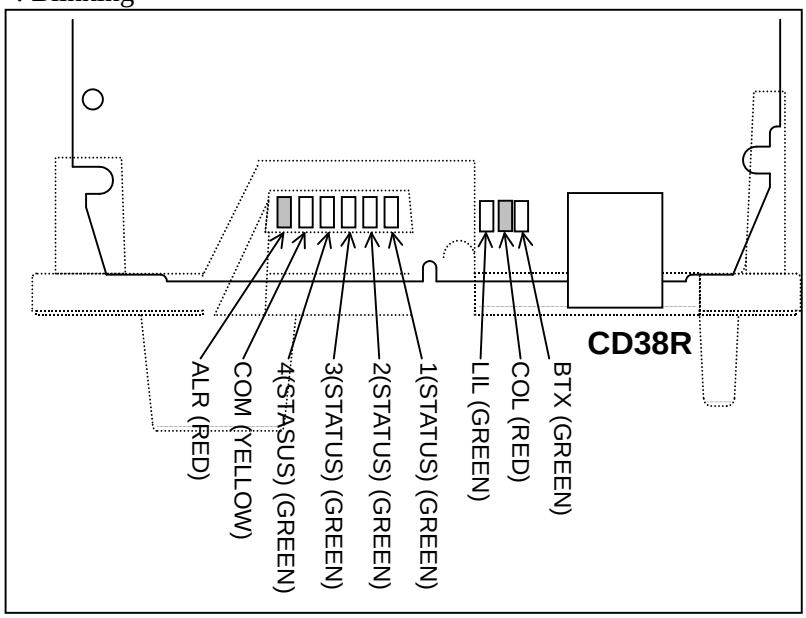


Name	PCB drawing No.	Remarks
Fast Ethernet board	A20B-8101-0030	

1.1.2 LED Indications and Meanings

The Fast Ethernet board provides four green LEDs (STATUS) and one red LED (ALARM) for status indication, and provides three green LEDs and one red LED for communication status indication. The figure below shows the locations of these LEDs. The table below explains the LED lighting states.
In the following explanations, the LED lighting states are expressed as follows:

□: Off ■: On ☆: Blinking



NOTE
The face plate is indicated using dotted lines.

LED display transition for LED1, LED2, LED3, and LED4 (during power-on)

LED display L4 L3 L2 L1	Status	Meaning
□□□□	Power-off	
■■■■	Immediately after power-on	Initial state entered immediately after power-on. If the Fast Ethernet board is stopped in this condition, the cause is one of the following: → The software is not stored in the Flash ROM of the CNC. → The Fast Ethernet board is defective.
■■■□	Start of Fast Ethernet board	The Fast Ethernet board has started. If the Fast Ethernet board is stopped in this condition, the Fast Ethernet board may be defective.
■■□□	Completion of software downloading	The software has been downloaded to the Fast Ethernet board. If the Fast Ethernet board is stopped in this condition, the Fast Ethernet board may be defective.
■□□□	Firmware OS started.	The software OS has started. If the Fast Ethernet board is stopped in this condition, the cause is one of the following: → The software stored in the Flash ROM of the CNC is destroyed. → The Fast Ethernet board is defective.
□■■■	Completion of software OS initialization	Initialization of the software OS is completed. If the Fast Ethernet board is stopped in this condition, the cause is one of the following: → The software stored in the Flash ROM of the CNC is destroyed. → The Fast Ethernet board is defective.

LED display L4 L3 L2 L1	Status	Meaning
□■■☆	Completion of parameter reading	The Ethernet parameters have been read. If the Fast Ethernet board is stopped in this condition, the cause is one of the following: → The Ethernet function option (S707) or Data Server function option (S737) is not installed. → The IP address or subnet mask is not set.
□□□☆	Start completion	The Fast Ethernet board has started normally.

LED display for LED1, LED2, LED3, and LED4 (during normal operation)

LED display L4 L3 L2 L1	Status	Meaning
□□□☆	Normal status	The board is operating normally.

LED display for BTX, LIL, COM, and ALM (during normal operation)

LED display	Status	Meaning
BTX ■	100BASE-TX connection in progress	The communication rate is 100BASE-TX.
BTX □	10BASE-T connection in progress	The communication rate is 10BASE-T.
LIL ■	Connected to hub	The board is connected to the hub.
COM ■	Transmission/reception in progress	Data is being transmitted or received.
ALM □	No alarm	No alarm is issued

LED display for LED1, LED2, LED3, and LED4 (when abnormality occurs)

The STATUS LEDs are turned on and off repeatedly with long on-time and short on-time.

LED display [Long on-time] 4 3 2 1	LED display [Short on-time] 4 3 2 1	Status	Description
■■□□	□□□■	Error on another board	A defect on another board or a problem on another board was detected.
■■□□	□□■□	Bus error	Software has a problem, or the Fast Ethernet board is defective.
■■□□	□□■■	Parity alarm	The Fast Ethernet board is defective.
■□■□	□□□□	Illegal general instruction	Software has a problem, or the Fast Ethernet board is defective.
■□■□	□□□■	Illegal slot instruction	Software has a problem, or the Fast Ethernet board is defective.
■□■□	□■□□	CPU address error	Software has a problem, or the Fast Ethernet board is defective.

NOTE

If an error occurs with the LEDs turned on and off with long on-time and short on-time in a manner not indicated above, contact FANUC.

LED display for COL, LIL, and ALM (when abnormality occurs)

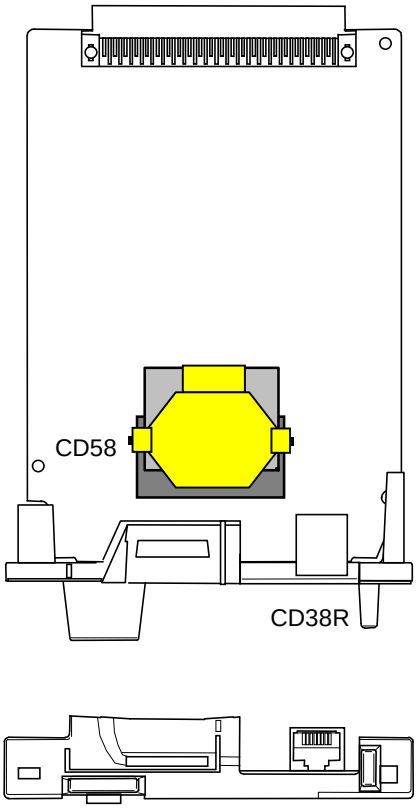
LED display	Status	Description
COL ■ COL ☆	Collision occurs. (Data collision occurs.)	In the half duplex communication mode, the COL LED is on or blinks at short intervals if traffic of Ethernet communication is high or ambient noise is high. In the full duplex communication mode, the COL LED does not light.
LIL □	Not connected to hub	The board is not connected to the hub properly. The LIL LED stays off also when the power to the hub is off. Check whether the board is connected to the hub properly.

LED display	Status	Description
ALM ■	Parity error occurs.	A parity error occurred in memory on the Fast Ethernet board. The Fast Ethernet board is defective.

1.2 Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, AND Series 0*i*-F

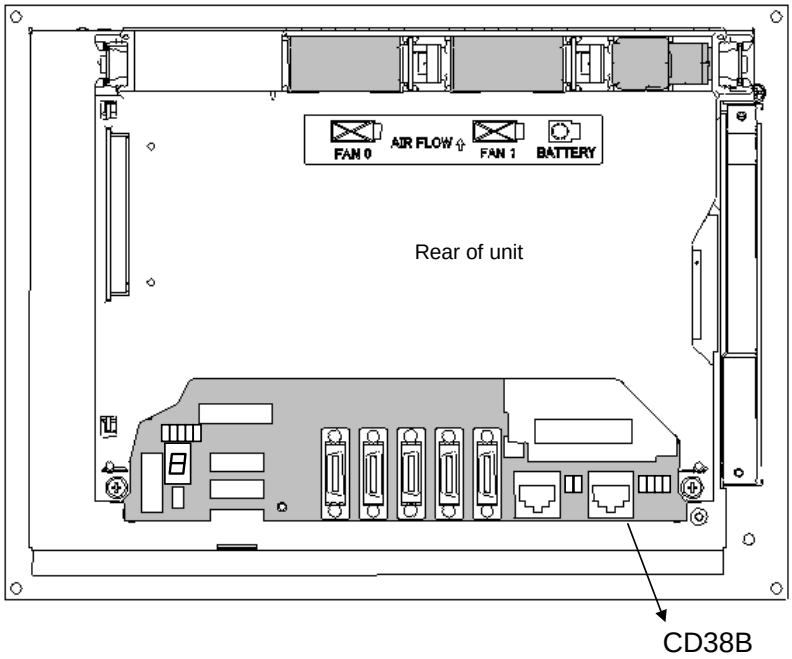
1.2.1 Component Layout

Fast Ethernet board (common to LCD-mounted type/Stand-alone type)



Name	PCB drawing No.	Remarks
Fast Ethernet board	A20B-8101-0770	

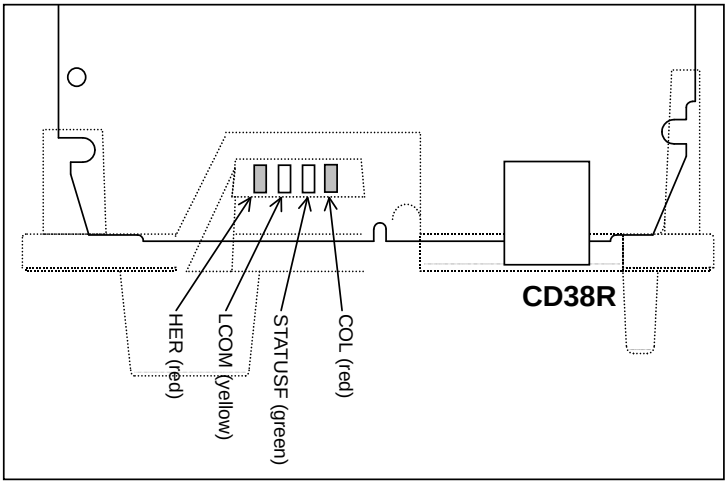
Control unit with Multi-function Ethernet (LCD-mounted type)



1.2.2 LED Indications and Meanings

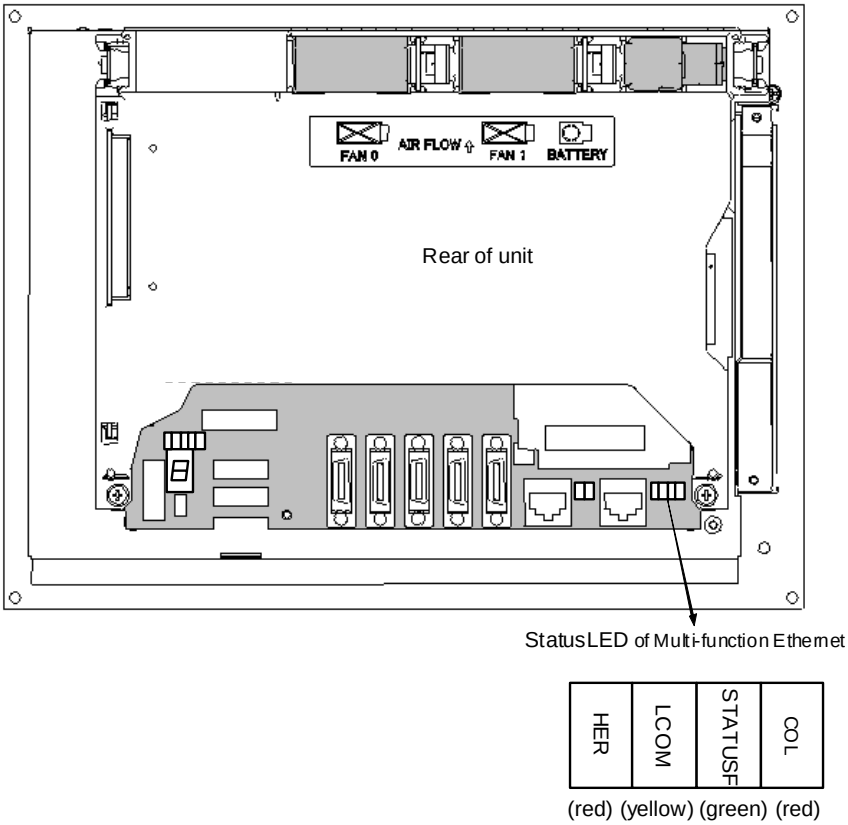
The board provides one green LED (STATUSF) and one yellow LED (LCOM) for status indication, and two red LEDs (HER, COL).
The figure below shows the locations of these LEDs. The table below explains the LED lighting state.

Fast Ethernet board (common to LCD-mounted type/Stand-alone type)



NOTE
The face plate is indicated using dotted lines.

Control unit with Multi-function Ethernet (LCD-mounted type)



In the following explanations, the LED lighting states are expressed as follows:
□: Off ■: On ☆: Blinking

LED display transition for STATUSF (during power-on)

LED display	Status	Meaning
□	Power-off	
■	Immediately after power-on	Initial state entered immediately after power-on. If the board is stopped in this condition, the cause is one of the following: → The CNC communication software may not be running normally. Check whether the communication software is installed properly. → The hardware option may be faulty. Replace the Fast Ethernet board (main board when Multi-function Ethernet is used).
☆	Start completion	The board has started normally.

LED display for STATUSF (during normal operation)

LED display	Status	Meaning
☆	Normal status	The board is operating normally.

LED display for LCOM

LED display	Status	Meaning
□	Not connected to hub	The board is not connected to the hub properly. The LED stays off also when the power to the hub is off. Check whether the board is connected to the hub properly.
■	Connected to hub	The board is connected to the hub.
☆	Transmission/reception in progress	Data is being transmitted or received.

LED display for COL

LED display	Status	Meaning
□	Normal status	The board is operating normally.
■ ☆	Collision occurs. (Data collision occurs.)	In the half duplex communication mode, this LED is on or blinks at short intervals if traffic of Ethernet communication is high or ambient noise is high. In the full duplex communication mode, the LED does not light.

LED display for HER

LED display	Status	Meaning
□	Normal status	The board is operating normally.
■	Error detected in the Ethernet circuit on the main board or option board.	The cause may be the faulty Fast Ethernet board (main board when Multi-function Ethernet is used) or a malfunction due to noise.
☆	Error detected in the software	

2 SOFTWARE MAINTENANCE INFORMATION

This chapter provides software maintenance information related to the hardware option.

2.1 Ethernet LOG

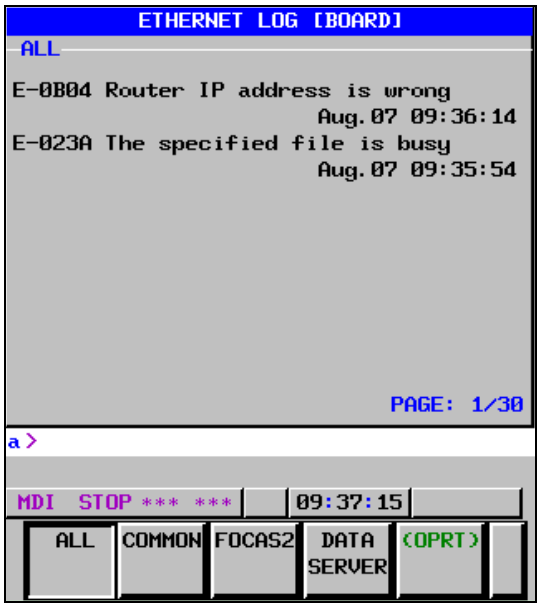
A log related to the hardware option is displayed.

ETHERNET LOG screen

Procedure

1 Press the function key [MESSAGE].

2 Press soft key [BOARD LOG] ([ETHER LOG] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, or Series 0*i*-F) to display the LOG screen for the hardware option. (If the soft key is not found, press the continuous menu key.)



LOG screen

The latest log information is displayed at the top of the screen. At the right end of a log item, the occurrence date and time of the log item is indicated. Date and time data is indicated in the format "MMM.DD hh:mm:ss", where MMM represents a month, DD represents a day, hh represents hours, mm represents minutes, and ss represents seconds.
The top item in the example above indicates "09:36:14 on August 7".

To clear the log information, press soft key [(OPRT)] then soft key [CLEAR].

By operating the LOG screen of the hardware option, log information can be displayed for each function.

(1) Soft key [ALL]
This soft key displays all log information related to the hardware option.

(2) Soft key [COMMON]
This soft key displays log information related to the parameter setting and basic communication function of the hardware option.
(3) Soft key [FOCAS2]
This soft key displays log information related to the FOCAS2/Ethernet function.
(4) Soft key [DATA SERVER]
This soft key displays log information related to the Data Server.
(5) Soft key [REMOTE DIAG]
This soft key displays log information related to the machine remote diagnosis functions.
(6) Soft key [UNSOLI MSG]
This soft key displays log information related to the Unsolicited Messaging functions.
(7) Soft key [FTP TRANS]
This soft key displays log information related to the FTP file transfer functions.

NOTE
The Ethernet log information is stored in volatile memory and is lost when the power to the CNC is turned off. Check the log information when an error occurs.

Error number	Log message	Meaning and action to be taken
E-0118 E-0119	Error occurred while wait for FOCAS2 pdu	A communication error occurred due to one of the following causes: → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected.
E-011A	All communication paths are busy	All FOCAS2/Ethernet communication paths are being used.
E-0126	No response from RMT DIAG server	The IP address of the machine remote diagnosis accepting server may be invalid or the power to the machine remote diagnosis accepting server may be off. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the power to the machine remote diagnosis accepting server is on. Alternatively, the machine remote diagnosis accepting server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 of parameter No. 905 to 1 and connect the server again.
E-012D	No response from router	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.

Error number	Log message	Meaning and action to be taken
E-0148	Cannot save parameter for Unsolicited Message	When the FOCAS2 function “cnc_wrunsolicprm2” is received, the save of parameters for the Unsolicited Messaging function failed due to one of the following causes: → The mode of the Unsolicited Messaging function isn’t “PC MODE”. → The status of the Unsolicited Messaging function isn’t “Not Ready”. →The wrong value exists in the argument “the parameters for the Unsolicited Messaging” of the FOCAS2 function “cnc_wrunsolicprm2”.
E-0149	The received parameter for Unsolicited Message is wrong	When the FOCAS2 function “cnc_wrunsolicprm2”, “cnc_rdunsolicprm2” or “cnc_unsolicstart” is received, it is detected that the argument “the parameter number of the Unsolicited Messaging” is wrong.
E-0200	(Received message from FTP server)	A message sent from the FTP server is displayed as is. A message containing kanji, hiragana, and/or katakana characters may not be displayed correctly.
E-0202	Connection failed with FTP server	The FTP server software may not be running. Run the FTP server software. Alternatively, the setting may be made so that the FTP server cannot be connected to increase the security level (such as a firewall setting). Change the firewall setting so that the FTP server can be connected.
E-0207	The router is not found	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.
E-0208	The FTP server is not found	The IP address of the FTP server may be invalid or the power to the FTP server may be off. Check whether the IP address of the FTP server is valid and whether the power to the FTP server is on. Alternatively, the FTP server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 of parameter No. 905 to 1 and connect the server again.
E-020B	Cannot login into FTP server	Check the user name and password for logging in to the FTP server.
E-020C	The parameters of FTP server are wrong	Check the user name and password for logging in to the FTP server.
E-020D	Changing a work folder of host failed	Check the work folder for logging in to the FTP server.
E-0219	The DNC file is not found	Check whether the file for DNC operation is specified correctly.
E-021A	The specified file is not found	Check whether the specified file is present.
E-021B	Opening a file failed	The file could not be opened. Check the error code in parentheses.
E-021F	FTP transfer is busy on BUFFER mode	FTP communication could not catch up with data supply. Correct the file division size. Alternatively, set bit 0 of parameter No. 0904 to 1.
E-0220	There is no file in list file	No file is defined in the list in the buffer mode. Correct the file list.
E-0221	The specified file already exists	The specified file is already present on the memory card of the Data Server. Delete the existing file. Alternatively, change the file name.

Error number	Log message	Meaning and action to be taken
E-0223	Writing data to the file failed	Data could not be written to the memory card of the Data Server. Check the error code in parentheses.
E-023A	The specified file is busy	The file on the memory card of the Data Server is currently used. When a file on the memory card is selected as a main program, the file is regarded as being used.
E-0252	Contents of ATA card are broken	Format the memory card of the Data Server.
E-02F0	ATA card is not found	Check whether a memory card is installed in the Data Server.
E-02F3	ATA card is not mounted	Check whether the memory card of the Data Server is destroyed and whether the memory card has been formatted.
E-041A	Frame transmission failed (TCP)	A communication error occurred due to one of the following causes: → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected. → Data cannot be posted to the communication destination due to a firewall setting.
E-0A02	Cannot read MAC address	The MAC address may not be written on the hardware option or the board may be damaged.
E-0A06	Network is too busy	An excessive amount of data flows over the network. Take action such as dividing the network.
E-0B00	The own IP address is wrong	Set the IP address according to the IP address specification format.
E-0B01	The own IP address is not set	Set the IP address.
E-0B02	Subnet mask is wrong	Set the subnet mask according to the subnet mask specification format.
E-0B03	Subnet mask is not set	Set the subnet mask.
E-0B04	Router IP address is wrong	There may be a conflict between the classes of the local node and router IP addresses.
E-0B05	IP address of DNS server is wrong	There may be a conflict between the classes of the local node and DNS server IP addresses.
E-0B06	The own host name is wrong	Check the host name setting.
E-0B07	The own domain name is wrong	Check the domain name setting.
E-0B08	TCP port number is wrong	A value outside the valid setting range may be set.
E-0B09	UDP port number is wrong	A value outside the valid setting range may be set.
E-0B0B	IP address of remote FTP server is wrong	Set the IP address according to the IP address specification format.
E-0B0C	Port number of a remote FTP server is wrong	A value outside the valid setting range may be set.
E-0B0D	User name of remote FTP server is wrong	A character unavailable for a user name may be used.
E-0B0E	Password of remote FTP server is wrong	A character unavailable for a password may be used.
E-0B0F	Login folder of remote FTP srv is wrong	A character unavailable for a login folder name may be used.
E-0B10	Port number of own FTP server is wrong	A value outside the valid setting range may be set.
E-0B11	User name of own FTP server is wrong	A character unavailable for a user name may be used.
E-0B12	Password of own FTP server is wrong	A character unavailable for a password may be used.
E-0B13	Login folder of own FTP server is wrong	A character unavailable for a login folder name may be used.

Error number	Log message	Meaning and action to be taken
E-0B14	IP address of Remote Diag is wrong	Set the IP address of the machine remote diagnosis accepting server according to the IP address specification format.
E-0B15	Port number of Remote Diag is wrong	A value outside the valid setting range may be set.
E-0B18	Cannot set because DHCP is available	To set the item, disable the DHCP client function.
E-0B27	Unsolicited Message isn't available	The software conditions to use the Unsolicited Messaging function are not satisfied. Refer to Chapter 6, ”UNSOLICITED MESSAGING FUNCTION” in Part II, “SPECIFICATION”.
E-0B29	Mode of Unsolicited Message is wrong	The FOCAS2 function “cnc_wrunsolicprm2” can't be execute in “CNC MODE”.
E-0B2A	Status of Unsolicited Message is wrong	The application of parameters for the Unsolicited Messaging function failed because the status of the Unsolicited Messaging function is not “Not Ready”. This error occurred due to one of the following causes when the status is not “Not Ready”: → The FOCAS2 function “cnc_wrunsolicprm2”, or “cnc_unsolicstart” is executed. → The soft key [APPLY] is pressed.
E-0B2B	Cannot refresh param of Unsolicited Message	The application of parameters for the Unsolicited Messaging function failed due to one of the following causes: → The problem of E-0B29 or E-0B2A occurred. → The invalid value exists in the parameters for the Unsolicited Messaging function.
E-0B44	Invalid value exists in Transmission parameter of Unsolicited Message	The non-effective value exists in “TRANSMISSION NUMBER” or “TRANSMISSION PARAMETER (NO.1-3)”.
E-0B45	The total of Transmission size of Unsolicited Message exceeds the limitation	The total transmission size of the parameters for the Unsolicited Messaging function exceeds the available maximum size. Refer to Subsection 6.1.2, “Setting by CNC screen” in Part II, “SETTING” for the available maximum size.
E-XXXX	(No message)	Internal error. Report the error number.

The meaning of the error codes indicated in error messages E-02XX are as follows:

Error code	Meaning
2	The available space of the memory card of the Data Server is insufficient.
10	The specified folder cannot be found.
11	The allowable number of entries is exceeded.
12	Access to a folder was rejected.
14	The specified file cannot be found.
15	Access to a file was rejected.
19	An attempt was made to access a file being used.
22	The specified file name is illegal.
28	A TV check error was detected.
36	The specified file is already present.
37	The folder is not empty.
39	The specified folder is already present.
48	The available file size is exceeded.
74	An ISO code parity error was detected.

2.2 ETHERNET CONNECTION CONFIRMATION

By transmitting the PING command, the CNC can check that a connection is made with the communication destination.

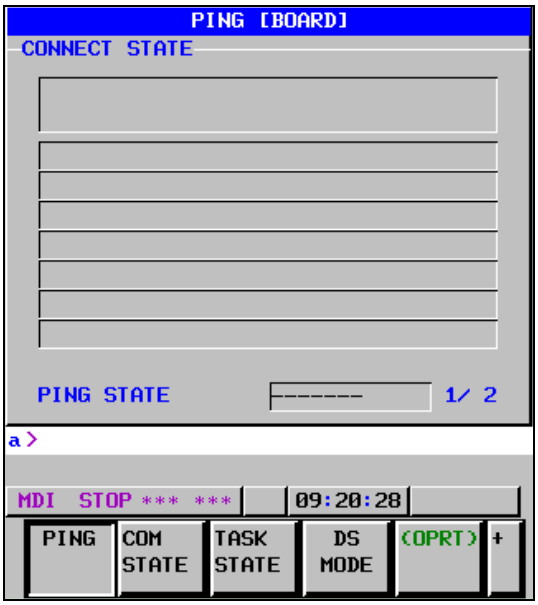
PING screen (connection state confirmation)

Procedure

1 Press the function key .

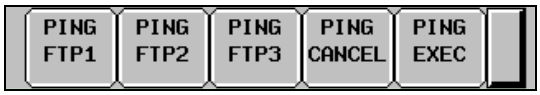
2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) is displayed. (If the soft key is not found, press the continuous menu key.)

3 Press soft key [ETHER BOARD] then soft key [PING].

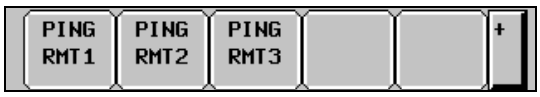


PING (CONNECT STATE) screen

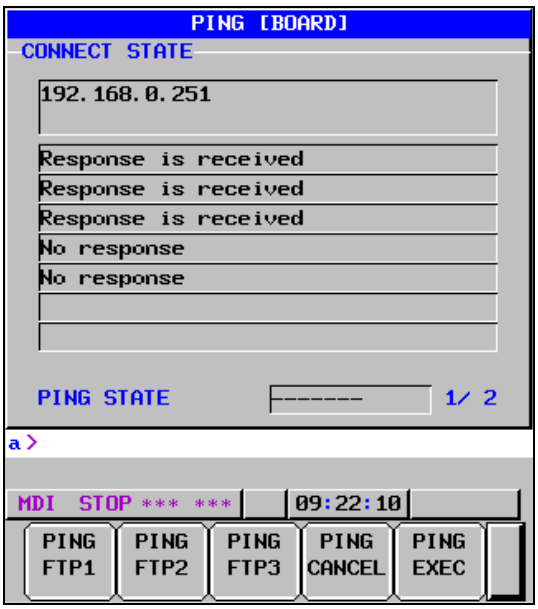
4 Press soft key [(OPRT)] then soft key [PING FTP1] to send the PING command to host 1 to which the Data Server function is connected. Similarly, press soft key [PING FTP2] and soft key [PING FTP3] to send the PING command to connection hosts 2 and 3, respectively.



5 Press soft key [(OPRT)] then soft key [PING RMT1] to send the PING command to inquiry destination 1 of the machine remote diagnosis functions. Similarly, press soft key [PING RMT2] to send the command to inquiry destination 2 and soft key [PING RMT3] to inquiry destination 3.



The results of PING execution are as follows:

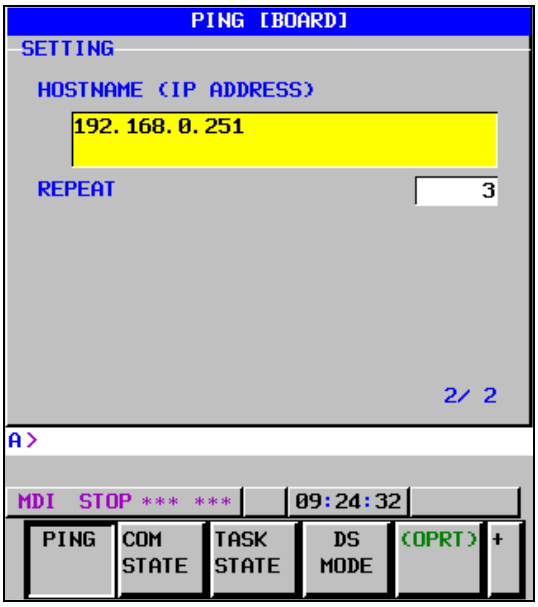


Execution results of PING

PING (SETTING) screen

Procedure

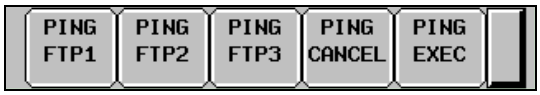
1 When sending the PING command to a desired destination, enter the destination address in HOSTNAME (IP ADDRESS) on the PING (SETTING) screen. Moreover, set a desired execution repeat value in REPEAT.



PING (SETTING) screen

2 After entering a host name (IP address) and repeat value, press soft key [(OPRT)] then soft key [PING EXEC] to send the PING command to the specified destination.

3 To cancel the transmission of the PING command halfway, press soft key [PING CANCEL].



2.3 COMMUNICATION STATE CONFIRMATION

The communication state of the hardware option detected by hardware can be checked.

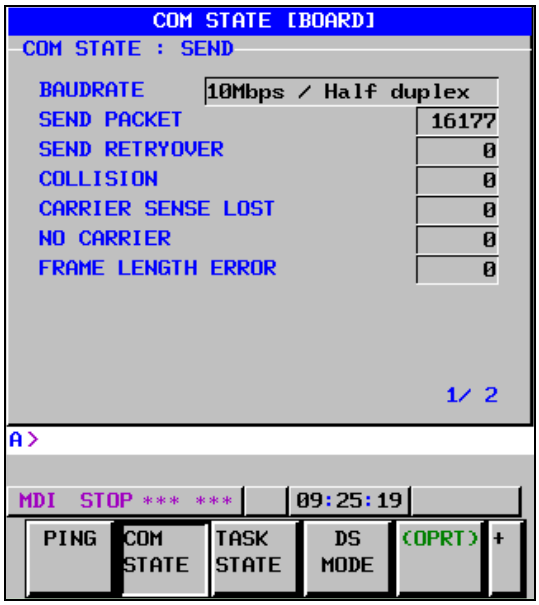
COM STATE (SEND / RECEIVE) screen

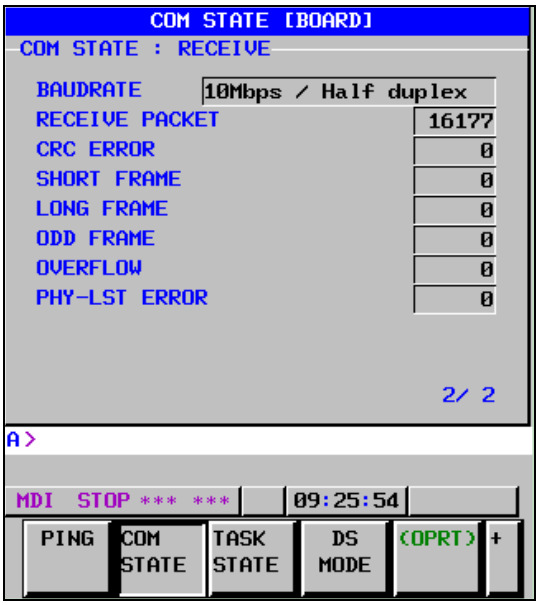
Procedure

1 Press the function key .

2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) is displayed. (If the soft key is not found, press the continuous menu key.)

3 Press soft key [ETHER BOARD] then soft key [COM STATE] to display the COM STATE screen.





COM STATE screen

Display item

Display item	Description
BAUDRATE	Displays the communication rate and mode. Communication rate: 100 Mbps or 10 Mbps Communication mode: Full duplex or Half duplex -------- : Not connected to HUB (only for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F)
SEND PACKET	Displays the number of sent packets.
SEND RETRYOVER COLLISION CARRIER SENSE LOST NO CARRIER FRAME LENGTH ERROR	Displays the number of errors detected during packet sending.
RECEIVE PACKET	Displays the number of received packets.
CRC ERROR SHORT FRAME LONG FRAME ODD FRAME OVERFLOW PHY-LSI ERROR	Displays the number of errors detected during packet reception.

Operation

To clear the number of sent packets, number of received packets, and number of errors of each type, press soft key [(OPRT)], then soft key [CLEAR].

2.4 COMMUNICATION SOFTWARE CONFIRMATION

The operation status of software running on the hardware option can be checked.

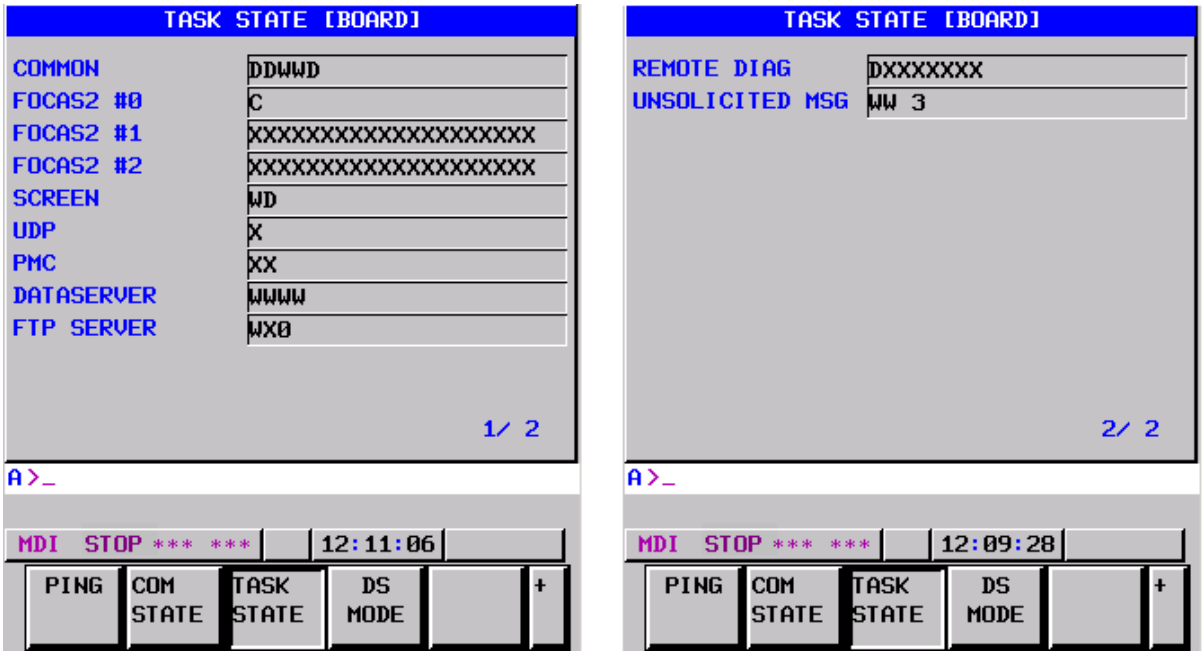
TASK STATE screen

Procedure

1 Press the function key SYSTEM.

2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F) is displayed. (If the soft key is not found, press the continuous menu key.)

3 Press soft key [ETHER BOARD] then soft key [TASK STATE] to display the TASK STATE screen.



TASK STATE screen

Display item

The meaning of each symbol is indicated below.

Display item	Symbol and meaning	Function that can be checked
COMMON	W : Data being processed (1) D : Data being processed (2) E : Start of software	Operation status of the basic function
FOCAS2 #0	C : Waiting for connection from the host W : Data being processed (1) D : Data being processed (2) N : FOCAS2 incapable of being executed	Operation status of the FOCAS2/Ethernet functions
FOCAS2 #1	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	

Display item	Symbol and meaning	Function that can be checked
FOCAS2 #2	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	
SCREEN	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the CNC screen display functions
UDP	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the UDP broad cast
PMC	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the FANUC LADDER-III function
DATASERVER	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the Data Server functions
FTP SERVER	W : Data being processed (1) D : Data being processed (2) Number : Number of sockets currently connected	
REMOTE DIAG	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the machine remote diagnosis functions
UNSOLICITED	W : Data being processed (1) D : Data being processed (2) N : Abnormal state X : Not executed yet Number : The existence signals is being transmitted during this number is being counted.	Operation status of the unsolicited messaging function
FTP	W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the FTP file transfer function
iPendant (Only with the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	C : Waiting for connection from the host W : Data being processed (1) D : Data being processed (2) X : Not executed yet	Operation status of the *i*Pendant function

2.5 FTP SERVER MAINTENANCE

The state of FTP clients connected to the FTP server can be checked and the FTP connection can be disconnected forcedly.

NOTE
To use this function, the DataServer Explorer connection option (R953) is required.

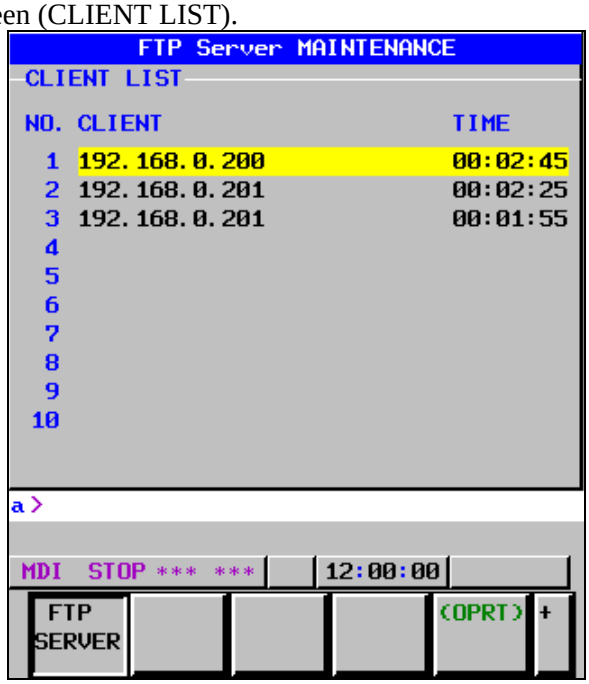
FTP Server MAINTENANCE screen (CLIENT LIST, CLIENT DETAIL)

Procedure

1 Press the function key .

2 Soft key [ETHER BOARD] ([ETHER NET] for the Series 30*i*/31*i*/32*i*-B or Series 0*i*-F) is displayed. (If the soft key is not found, press the continuous menu key.)

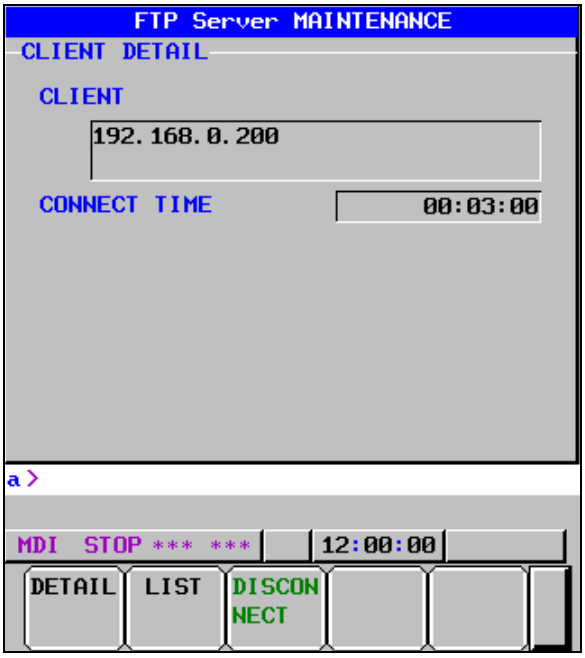
3 Press soft key [ETHER BOARD] then soft key [FTP SERVER] to display the FTP Server MAINTENANCE screen (CLIENT LIST).



FTP Server MAINTENANCE screen (CLIENT LIST)

4 By using cursor keys [↓] [↑], select a client, and press soft key [(OPRT)] then soft key [DETAIL] to display the FTP Server MAINTENANCE screen (CLIENT DETAIL) displaying the client information on the cursor.

The CLIENT DETAIL screen is as follows:



FTP Server MAINTENANCE screen (CLIENT DETAIL)

5 Press soft key [LIST] to display the CLIENT LIST screen again.

Display item

Item	Description
CLIENT	Displays the IP address of the FTP client connected to the FTP server. (Example of display format: "192.168.0.200") - In the CLIENT DETAIL screen: When the FTP connection is disconnected, "Disconnected" is displayed.
CONNECT TIME	Display the connect time of the FTP client connected to the FTP server. The format of the time is "hh:mm:ss" (hh: hour, mm: minute, ss: second). The time display is updated automatically. - In the CLIENT DETAIL screen: When the FTP connection is disconnected, "--:--:--" is displayed.

NOTE
1 The CLIENT DETAIL screen cannot be displayed when any client does not exist on the CLIENT LIST screen.
2 There is not the CLIENT DETAIL screen for 15-inch display unit.

Operation (DISCONNECT)

The selected client is disconnected on the CLIENT LIST screen and the CLIENT DETAIL screen.

1 When the CLIENT LIST screen is displayed, by using cursor keys [↓] [↑], select a client to be disconnected.
2 Press soft key [(OPRT)] then soft key [DISCONNECT].

3 Press soft key [EXEC] to disconnect the selected client.
When the CLIENT DETAIL screen is displayed, the displaying client is disconnected.

NOTE
An error occurs if the disconnect operation is attempted to execute when any client does not exist on the CLIENT LIST screen, or when the connection with the client is already disconnected on the CLIENT DETAIL screen.

Operation (ALL DISCONNECT)

All clients are disconnected on the CLIENT LIST screen.

1 Press soft key [(OPRT)] then soft key [ALL DISCON].

2 Press soft key [EXEC] to disconnect all clients.

NOTE
1 This operation can be executed only on the CLIENT LIST screen.
2 An error occurs if this operation is attempted to execute when any client does not exist on the CLIENT LIST screen.

2.6 ALARM AND DIAGNOSIS DATA

NOTE
This function is valid only for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F.

When using the hardware option on the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F, the following alarms might be displayed.
In this case, please confirm the diagnosis data and take the countermeasure.

Number	Message	Description
PW0050 (NOTE)	POWER MUST BE OFF (INITIALIZED COMMUNICATION)	When the power was turned on, the hardware option was initialized. Turn the power off, then on again to enable the communication function.
SR2038	WRONG COMMUNICATION COMBINATION	The combination of the hardware option and communication function is invalid. Details of an illegal combination are notified to diagnosis data Nos.4400 and 4401.

NOTE
Alarm PW0050 may be issued when a Fast Ethernet board is added or replaced or when the power is turned on after a communication function software option is changed.

		#7	#6	#5	#4	#3	#2	#1	#0
Diagnosis	**4400**			**BD4**	**BD3**	**BD2**	**BD1**		**MFE**

When an alarm SR2038 occurs, the detail information of wrong hardware option is indicated.

#0 MFE Multi-function Ethernet
#2 BD1 Fast Ethernet board mounted in slot1
#3 BD2 Fast Ethernet board mounted in slot2
#4 BD3 Fast Ethernet board mounted in slot3
#5 BD4 Fast Ethernet board mounted in slot4

NOTE
When an alarm SR2038 does not occur, all bits are "0".

Diagnosis	**4401**	**Detailed number of alarm SR2038**

When an alarm SR2038 occurs, the information is indicated.

Number	Description
0	The combination of the hardware option and communication function is correct.
1	The number of mounted the hardware option exceeds limitation. The number of the hardware options that can be mounted is up to three.
2	The hardware option that diagnosis data No.4400 indicates doesn't exist. Confirm the hardware option specified for parameter Nos.970 to 973, 975, and 976.
3	In the hardware option that diagnosis data No.4400 indicates, the working communication function is not specified. Parameter Nos.970 to 973, 975, and 976 are wrong though the hardware option exists. Specify "-1" for parameter Nos.970 to 973, 975, and 976 When not using it.

Number	Description
4	In the hardware option that diagnosis data No. 4400 indicates, two or more of Data Server functions, FL-net functions, EtherNet/IP functions, and PROFINET functions are specified simultaneously. The Data Server functions, FL-net functions, EtherNet/IP functions, and PROFINET functions are mutually exclusive. Specify parameters Nos. 970 to 973, 975, and 976 so that these communication functions operate in different hardware options.
5	In the hardware option that diagnosis data No.4400 indicates, a software option of necessary communication function is not effective. For parameter No. 970, the hardware option specified for parameter Nos. 971, 972, or 973 is specified. Alternatively, a hardware option is specified for parameter No. 970 and parameter No. 975 is set to ”10”, ”20”, or ”30”.
6	In the hardware option that diagnosis data No.4400 indicates, a software option of necessary communication function is not effective.

NOTE

Set parameters Nos. 971 to 973, 975, and 976 to use Industrial Ethernet (FL-net functions, EtherNet/IP functions, and PROFINET functions).
To use Industrial Ethernet, refer to the relevant connection manual listed in Section 1.2, "COMMUNICATION FUNCTIONS OPERATING ON HARDWARE OPTIONS" in Part II, "SPECIFICATION".

2.7 COMMUNICATION RETRY MONITORING FUNCTION

When the Fast Ethernet function on the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F is used, Fast Ethernet communication errors are checked at intervals of 10 seconds. If the number of errors detected during the last 1 minute reaches the value set for parameter No. 11533, warning signal WETF is output.
Since the number of detected errors is checked at intervals of 10 seconds, the warning signal is also output at intervals of 10 seconds. The signal output is reset by turning the power off, then on again.

NOTE

1 This function is valid only for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F.
2 The maximum value for network error counters is 65535.
If an overflow occurs, no warning is issued and the error count returns to 0.

Parameter

11533	Warning value for the number of fast Ethernet error detection occurrences

[Input type] Parameter input
[Data type] Byte
[Unit of data] Number of detection occurrences/minute
[Valid data range] 0 to 128
Recommended setting = 0
Set a warning value for the number of Fast Ethernet error detection occurrences.
When the number of 1- minute error detection occurrences becomes higher than or equal to the setting, the warning signal is output.
If the setting is 0, monitoring is performed on a 10 occurrences/minute basis.

NOTE
When this parameter is set, the power must be turned off before operation is continued.

Fast Ethernet communication abnormality warning signal WETF<F0535.5>

[Classification] Output signal

[Operation] This signal is output when a warning occurs.

[Function] If the total number of various errors detected by the communication hardware of the Fast Ethernet function is equal to or greater than the setting of parameter No. 11533 (standard setting 0, which means 10 retries per one minute), this signal is set to 1.
Once this signal is set to 1, the value is kept until the CNC power is turned off.

APPENDIX

A TROUBLESHOOTING

This appendix describes troubleshooting related to hardware option communication.

A.1 CHECKING COMMUNICATION WITH A HUB

(1) Make sure that the STP cable between the hub and the hardware option is connected.
(2) Make sure that cables are properly wired.
- Though communication is carried out when the cable pair at the send and receive sides is not properly mounted, communications errors may occur more frequently.

(3) Make sure that a hub for 100BASE-TX is used.
- A hub for 10BASE-T may be used to perform communication. In this case, however, the communication speed can decrease.

(4) Make sure that the LIL LED for the Series 30*i*/31*i*/32*i*-A or LCOM LED for the Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A or Series 0*i*-F on the hardware option is lit at all times.
- The LIL LED will not light if the hardware option is not connected to the hub or if the hub is not ON.

(5) Make sure that the LED (LINK indicator LED) on the connected hub is lit at all times.
- Some hubs do not have a LINK indicator LED.
- The LINK indicator LED will not light if the hub is not connected to the hardware option or the CNC is not ON.

(6) Make sure that a hub for full duplex communication only is not used.
- The hardware option automatically detects the communication speed and communication mode (full duplex or half duplex) by using the auto negotiation function. In communication with a hub that does not have the auto negotiation function, the hardware option recognizes the communication speed correctly but regards the communication mode as half duplex communication.
  As a result, when an attempt is made to communicate with a hub for full duplex communication only that does not have the auto negotiation function, there is a discrepancy in communication mode, so correct communication cannot sometimes be performed.

- For details on how to connect, see Part V "CONNECTION."

A.2 CHECKING SETTINGS

The following describes how to check the minimum settings needed for communications.

NOTE
For details on IP addresses, subnet mask and other set values, consult with the network administrator.

- Checking settings on the hardware option
  (1) Make sure that the MAC address of the hardware option is displayed.
    - This address is appended to each board before shipment from the factory, and is automatically displayed in the Setting screen. This address need not be set by the user.
  (2) Make sure that the IP address is set.
  (3) Make sure that the subnet mask is set.
  (4) When a router is used, make sure that the router IP address is set.

- Checking settings on the personal computer

(1) Make sure that the IP address is set.
(2) Make sure that the subnet mask is set.
(3) When a router is used, make sure that the router IP address is set.

- For details on how to set, see Part III "SETTING."

A.3 CHECKING COMMUNICATION

This section describes how to check the communication status between a CNC device and the other communicating partner (host computer). If communication with the CNC device sometimes fails or is not possible, first make sure that the communication path is normal by the following procedure. The "ping" command is used to check communication.
In the following example, a host computer running the Windows XP is used.

- Checking the communication path
  Open the DOS window, and enter 'ping "IP address of CNC"'. If a response is returned from the CNC device, the Fast Ethernet/Fast Data Server is connected to the CNC device.
  (1) When a response is returned (normal connection)

```
Command Prompt

C:¥>ping 192.168.1.50

Pinging 192.168.1.50 with 32 bytes of data:

Reply from 192.168.1.50: bytes=32 time<1ms TTL=128
Reply from 192.168.1.50: bytes=32 time<1ms TTL=128
Reply from 192.168.1.50: bytes=32 time<1ms TTL=128
Reply from 192.168.1.50: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:¥>_
```

  (2) When a response is not returned (abnormal connection)

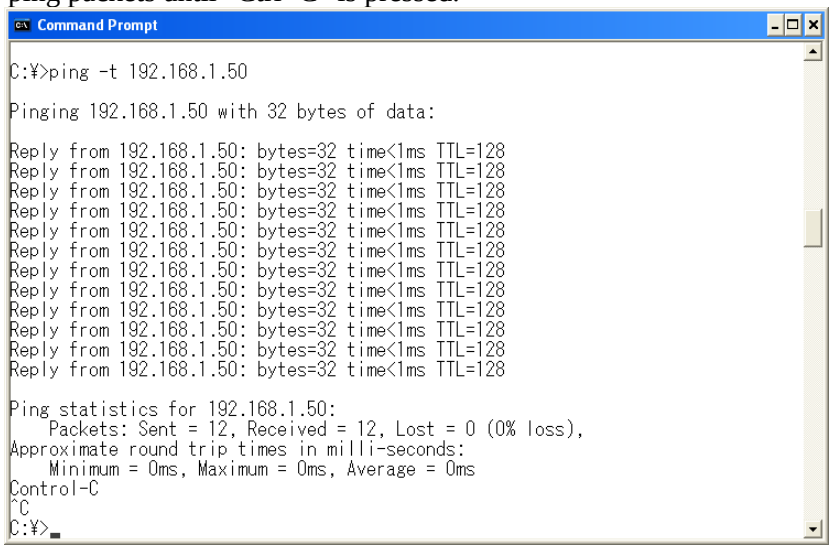
```
Command Prompt

C:¥>ping 192.168.1.50

Pinging 192.168.1.50 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.50:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:¥>_
```

  When a response is not returned, probable causes are either the hardware connection or a software setting, or both. Check the hardware connections and software settings again.

- Checking IP addresses for duplication
  IP addresses can be checked for duplication by the procedure described below.
  (1) Disconnect the Ethernet cable from the CNC device to isolate it from the network.
  (2) Execute a ping command on another personal computer as described in "• Checking the communication path."
  Since the CNC device is disconnected from the network, no response should be returned. If a response is returned, the IP address is in use on another unit. Therefore, the IP address cannot be used on the CNC device from which the cable was disconnected.

> ⚠ **CAUTION**
> The purpose of this check is to check for a duplicate IP address. It does not assure that the IP address is left non-duplicated because a unit having the same IP address may be turned on after the check or the same address may be set later.
> When setting an IP addressing, ask the network manager about duplication.

- Checking for influence of electrical noise
  The "ping" command "-t" option is used for checking for the influence of electrical noise. This option sends ping packets until "Ctrl+C" is pressed.



1. <u>About the influence of electrical noise from peripheral machinery (devices)</u>
   (1) Turn the CNC is mounted ON to enable communications.
   (2) Press the EMERGENCY STOP button on the machine with the servo/spindle amplifier OFF, and issue the "ping" command from the host computer.
   (3) Count the number of lost packets (packets for which a response was not returned).
   If a lost packet occurs in this state, the machine is probably being affected by electrical influence from peripheral machines.
   Countermeasure:
   Pin-point the source of the electrical noise, and check the wiring again to prevent the influence of electrical noise.

2. <u>About the influence of electrical noise from mounted machinery</u>
   (1) Start up the machine in the same way as 1 above.
   (2) Cancel the emergency stop on the machine with the servo/spindle amplifier ON, and issue the "ping" command from the host computer.
   (3) Count the number of lost packets.

If more lost packets than in 1 above are occurring, a probable cause is the influence of electrical noise on the machine itself. General probable causes are the state of the ground on the machine or on the communicating party.

Countermeasure:

Check the state of the ground on the machine or on the communicating party, and insulate the communications trunk with the machine.

- For the method of checking the operating status and communication status of the hardware option, see Part VI “MAINTENANCE” as well.

B EXAMPLE OF FTP SERVER SETUP

This appendix describes the method of setting up an FTP server that operates on the host computer to function as a communication destination for the Data Server functions.

NOTE

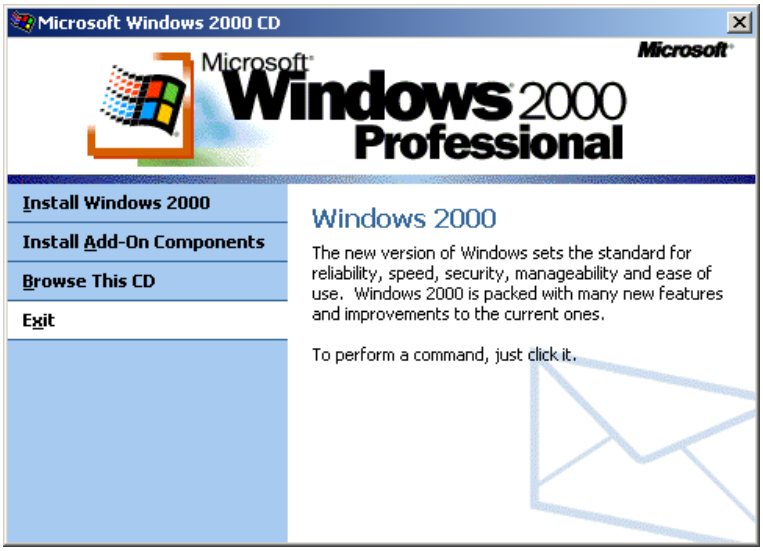
1 Before using an FTP server, completely check its operation since its behavior may change depending on the personal computer environment.
When DNC operation is performed in the Data Server FTP mode, a communication error may occur due to a timeout and DNC operation may be stopped, depending on the used FTP server since the transfer rate is slow. In this case, do not use the FTP server during DNC operation in the Data Server FTP mode.

2 This appendix provides just setup examples.
The actual setup may differ from these examples depending on the personal computer environment and other factors. When actually setting up an FTP server, make proper settings with referencing the personal computer manual and others.
To use an FTP server in a factory network, consult with the network administrator of the factory.

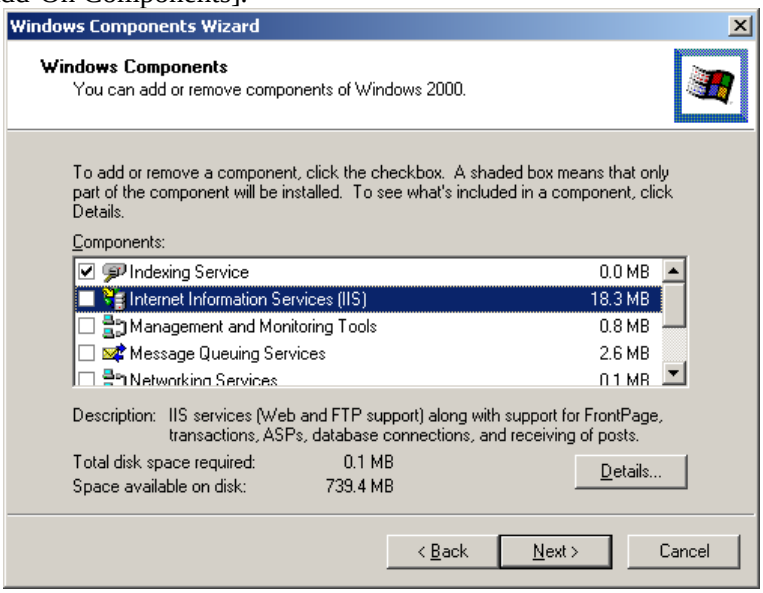
B.1 SETTING UP FTP SERVER OF Windows 2000 Professional (FOR INTERNET INFORMATION SERVICE)

Installing the Internet Information Service

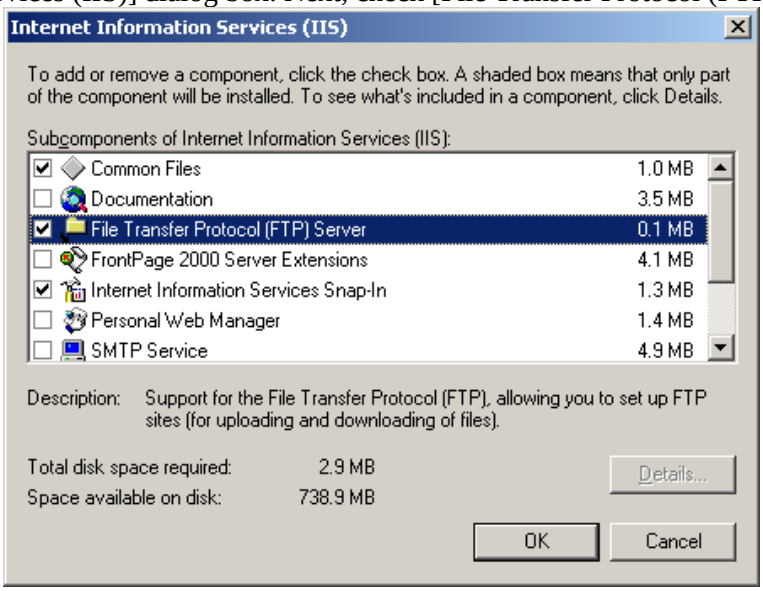
1. Set the CD-ROM of Windows 2000 Professional.



2. Click [Install Add-On Components].



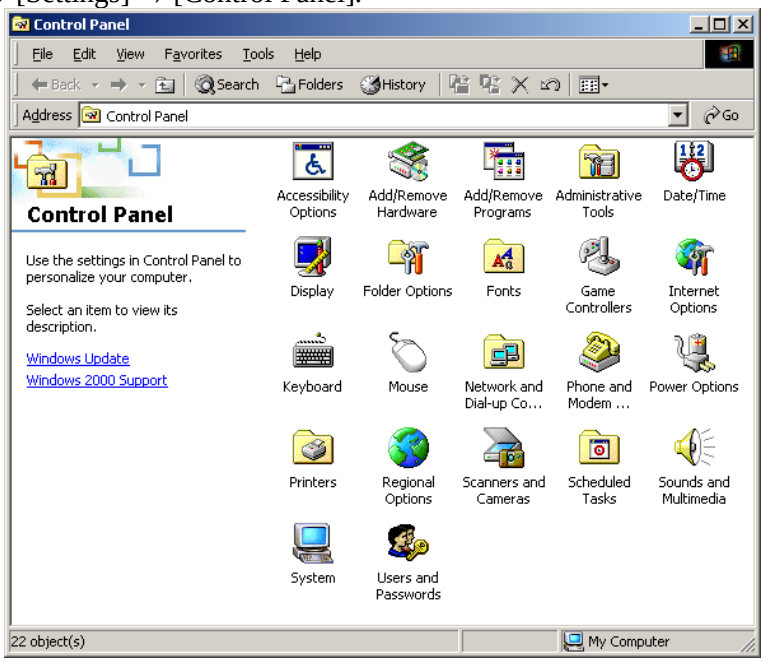
3. Select [Internet Information Services (IIS)], then click the [Details] button to display the [Internet Information Services (IIS)] dialog box. Next, check [File Transfer Protocol (FTP) Server].



4. Click the [OK] button, then return to the previous screen. Next, click [Next]. The necessary files are installed.
   The installation is completed when the following screen appears:

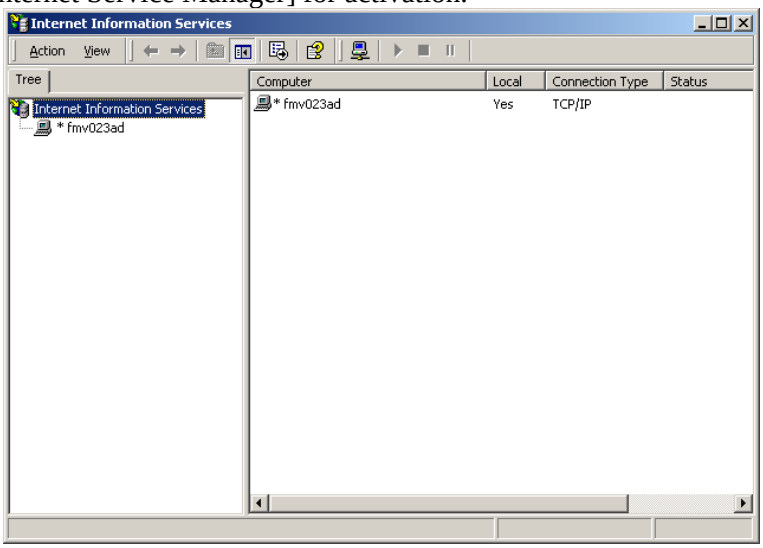
Setting the Internet Information Service

1. Select [Start] → [Settings] → [Control Panel].

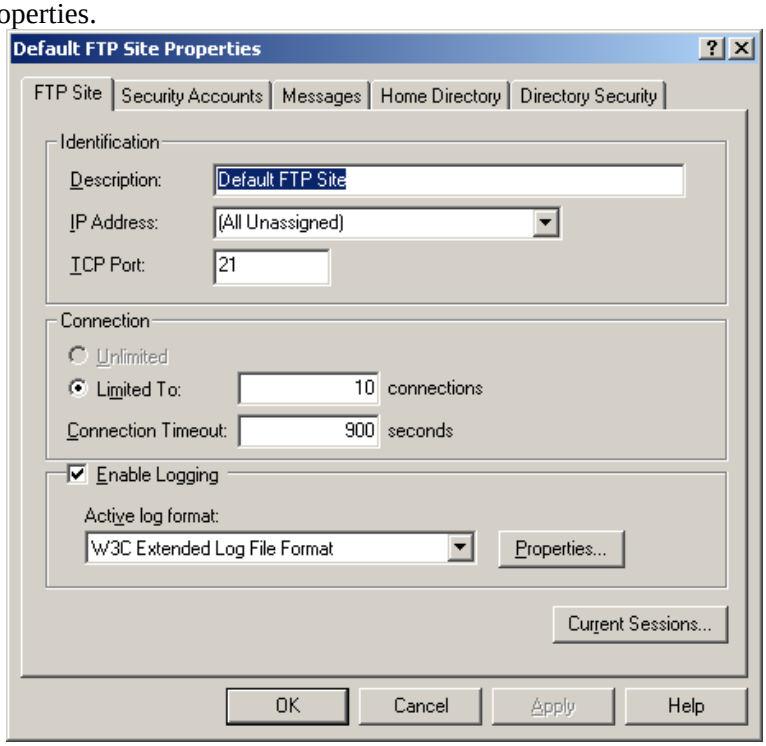


2. Double-click [Administrative Tools].

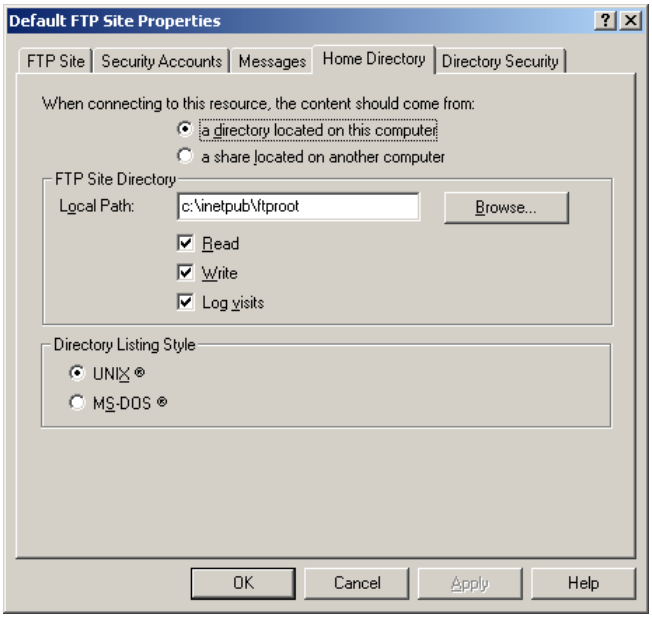
3. Double-click [Internet Service Manager] for activation.



4. Double-click the computer name. Next, select [Default FTP Site] and right-click to display the menu. Then, select Properties.



5. Select the [Home Directory] tab to display the [Home Directory] property sheet. Check [Read] and [Write] in [FTP Site Directory]. In [Directory Listing Style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.



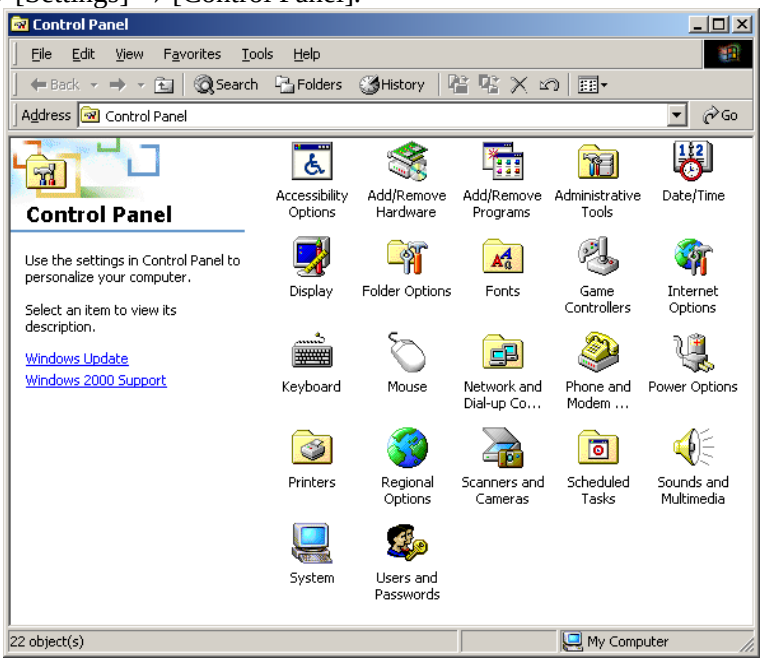
6. Upon completion of setting, click the [Apply] button.
In [Default FTP Site], the directory named "\Inetpub\ftproot", set in [Local Path] above (in the drive where Windows 2000 is installed), is assumed to be the home directory. So, directories under this directory can be accessed.
So, with the default setting, NC programs need to be managed under this directory.
The home directory can be changed by setting the new directory in the [Local Path] of [FTP Site Directory].

7. To access a directory other than the directories under the home directory, a virtual directory needs to be set.
   For details of a virtual directory, use the online help information of Windows 2000.

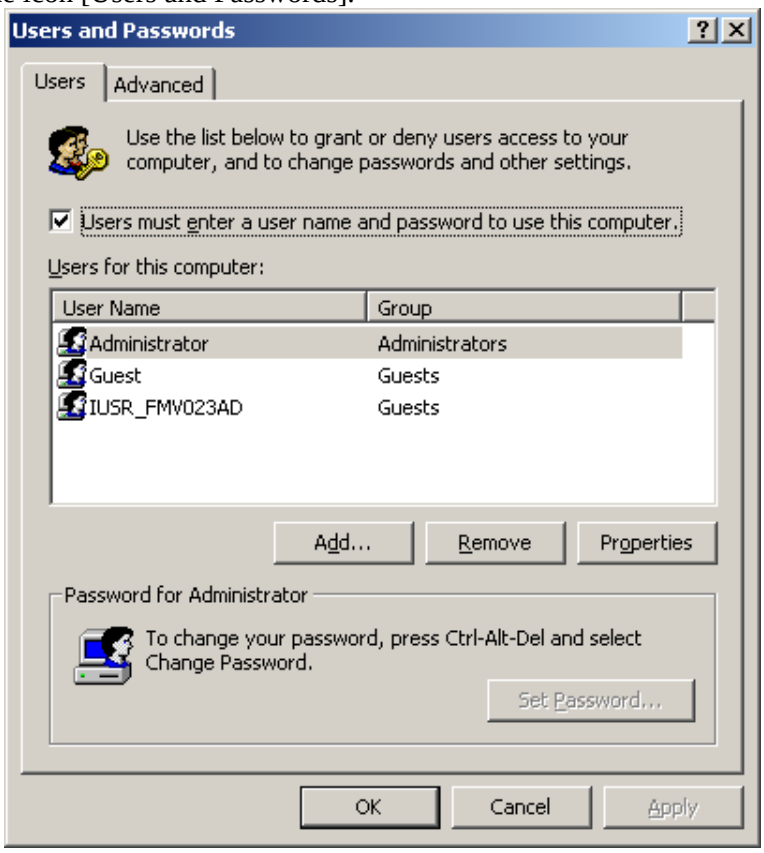
Login user setting

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

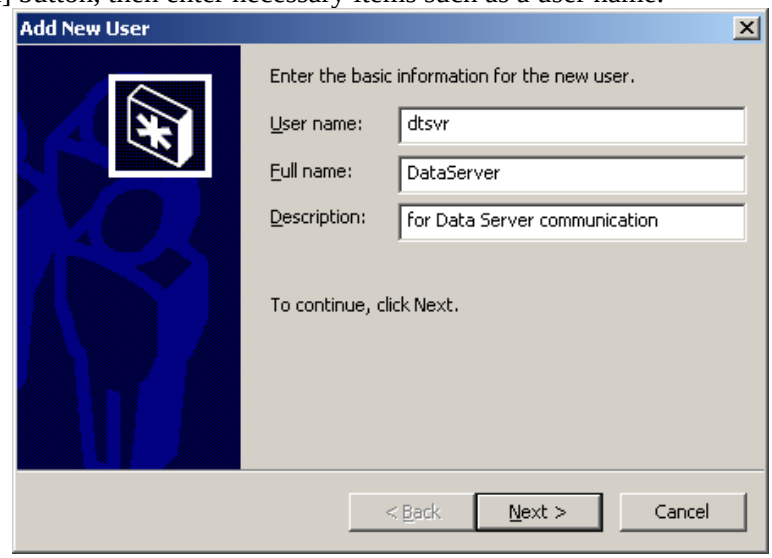
1. Select [Start] → [Settings] → [Control Panel].



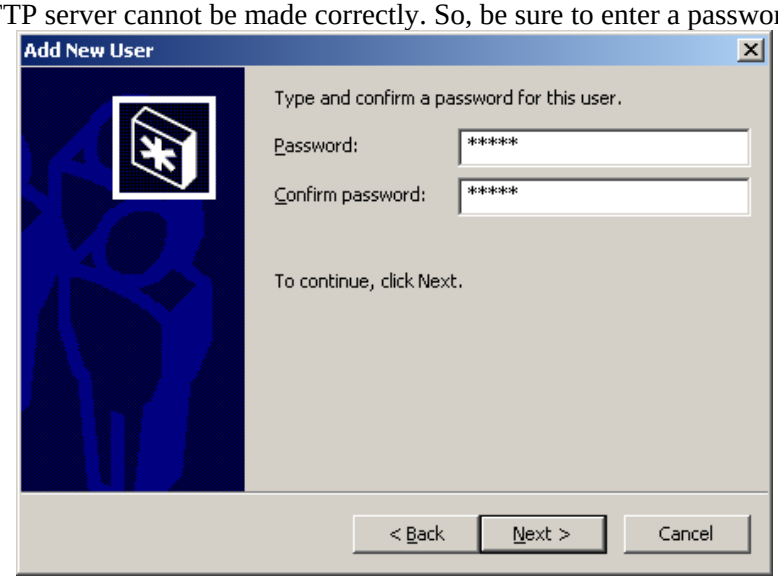
2. Double-click the icon [Users and Passwords].



3. Click the [Add] button, then enter necessary items such as a user name.



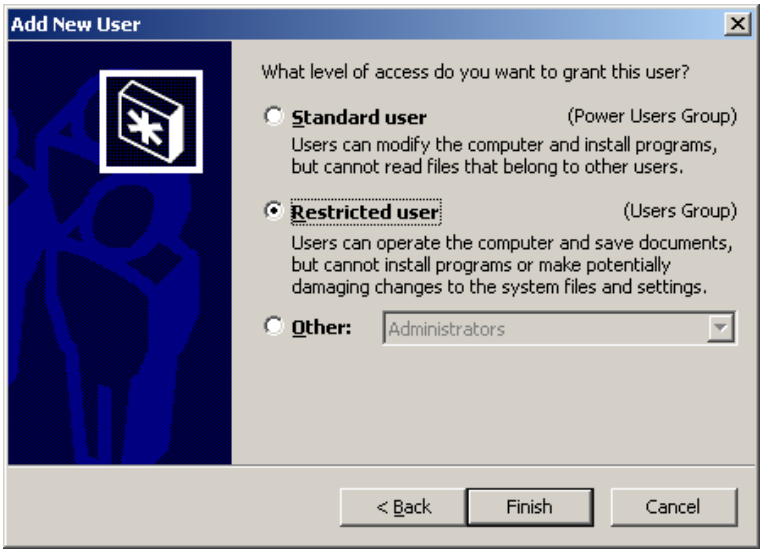
4. Click the [Next] button, then enter a password for the specified user name. (Unless a password is set, access to the FTP server cannot be made correctly. So, be sure to enter a password.)



5. Click the [Next] button, then set an access right to be granted.
   The access right set here can affect the capability to read from and write to a file in FTP-based communication. Use care when setting an access right.

NOTE

If the type of account is not to be changed to Administrator, a file may not be able to be read or written with the account. In this case, grant an access right to read and write the home directory set in steps 5 and 6 in "Setting the Internet Information Service" described above to the user account.



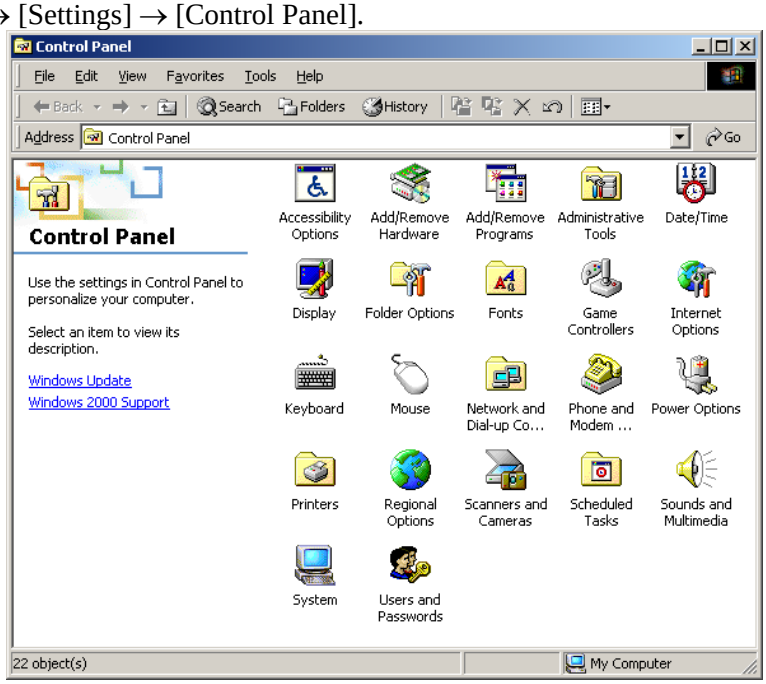
6. Click the [Finish] button. The entered user name is registered, and the user can log in by using the user name and password.

Stopping password expiration for a login user

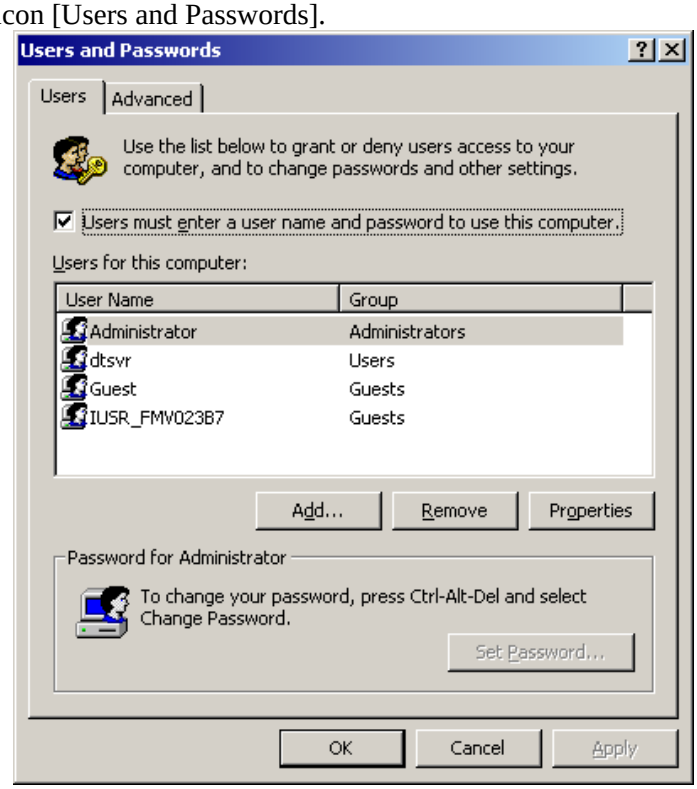
If the password expiration is not stopped, when the password expires, login is disabled, preventing FTP communication.
Therefore, stop the password expiration as necessary.

When a password has expired, it is necessary to set the password again.

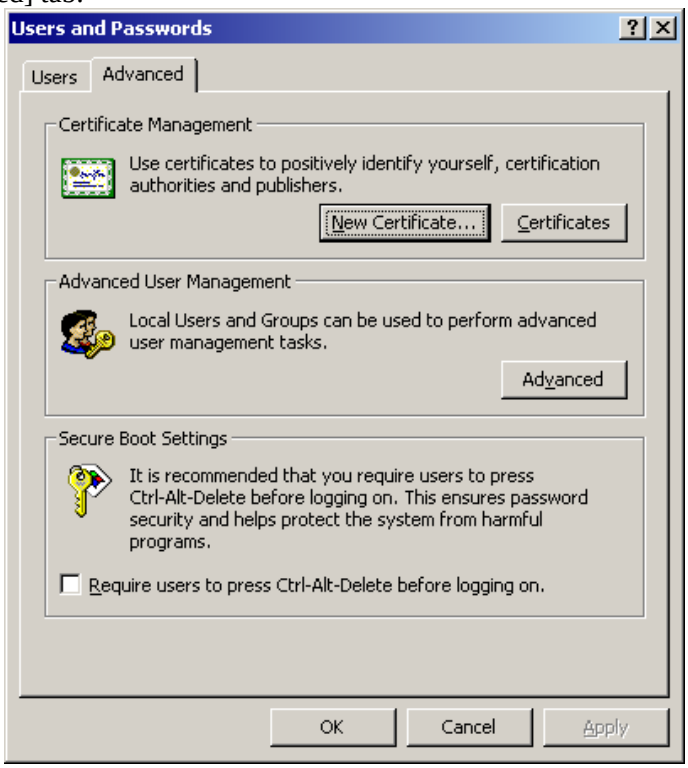
1. Select [Start] → [Settings] → [Control Panel].



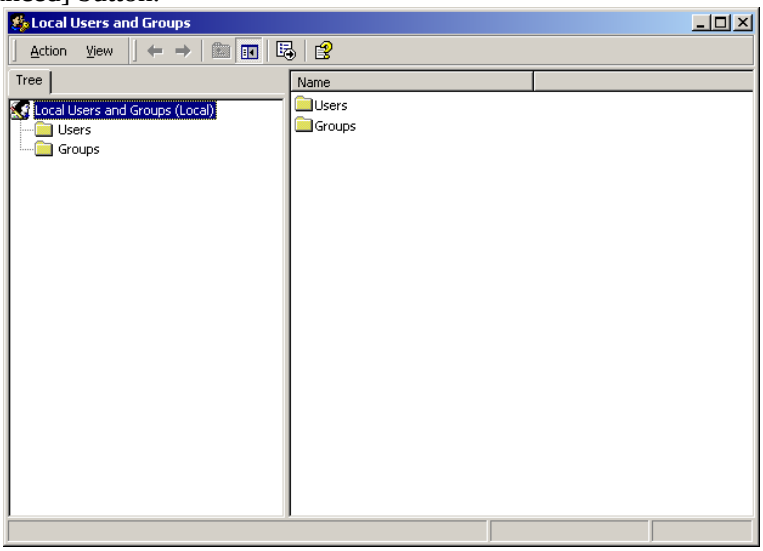
2. Double-click the icon [Users and Passwords].



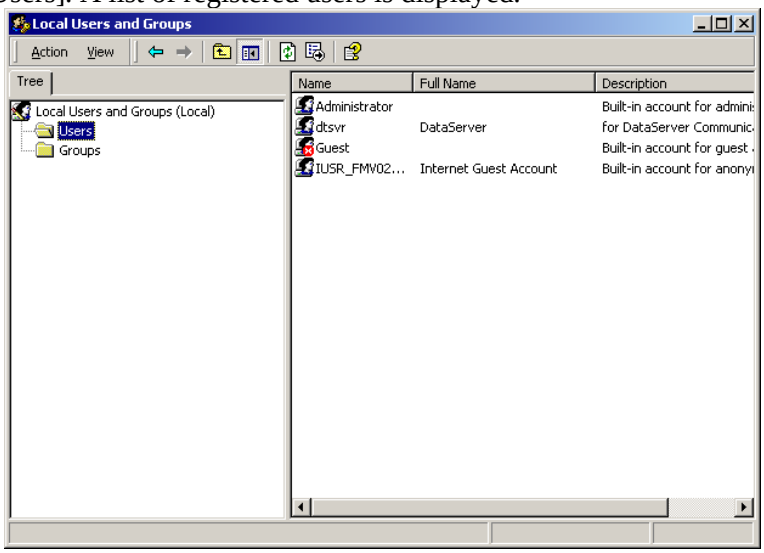
3. Click the [Advanced] tab.



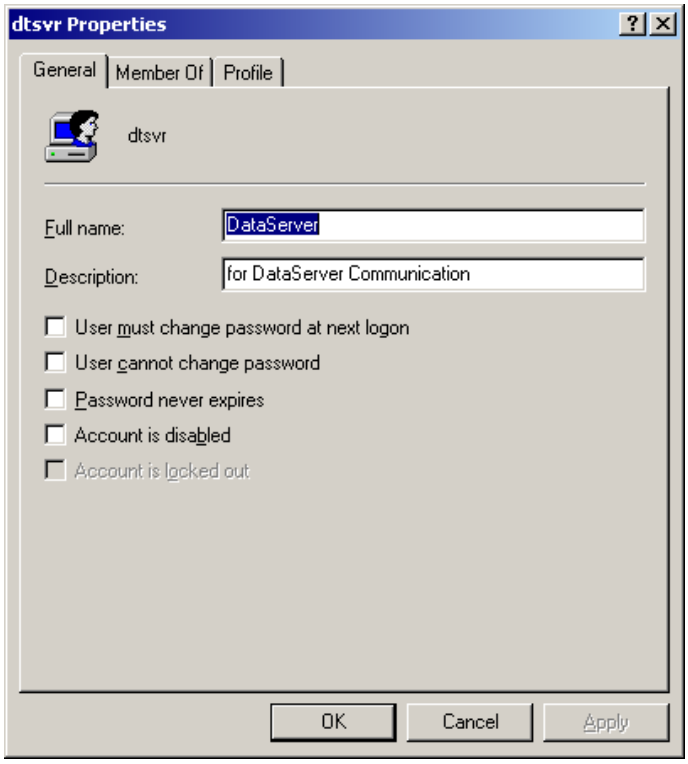
4. Click the [Advanced] button.



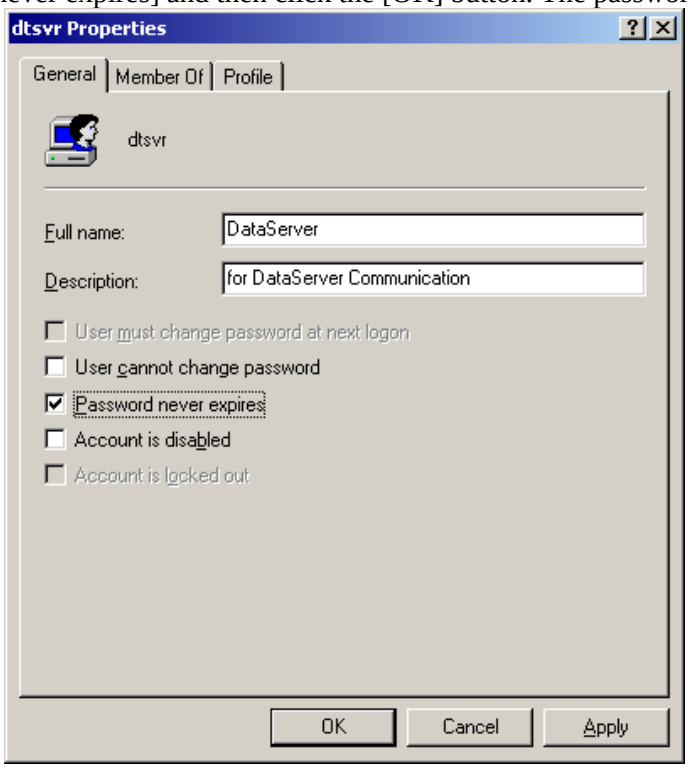
5. Double-click [Users]. A list of registered users is displayed.



6. Double-click the user name for which you want to change the password setting.
For example, double-click "dtsvr".



7. Check [Password never expires] and then click the [OK] button. The password expiration is stopped.

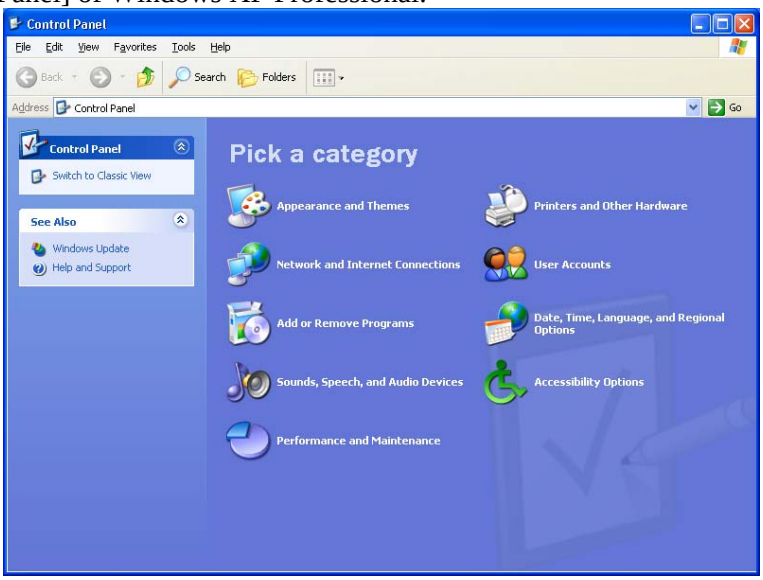


B.2 SETTING UP FTP SERVER OF Windows XP Professional (FOR INTERNET INFORMATION SERVICE)

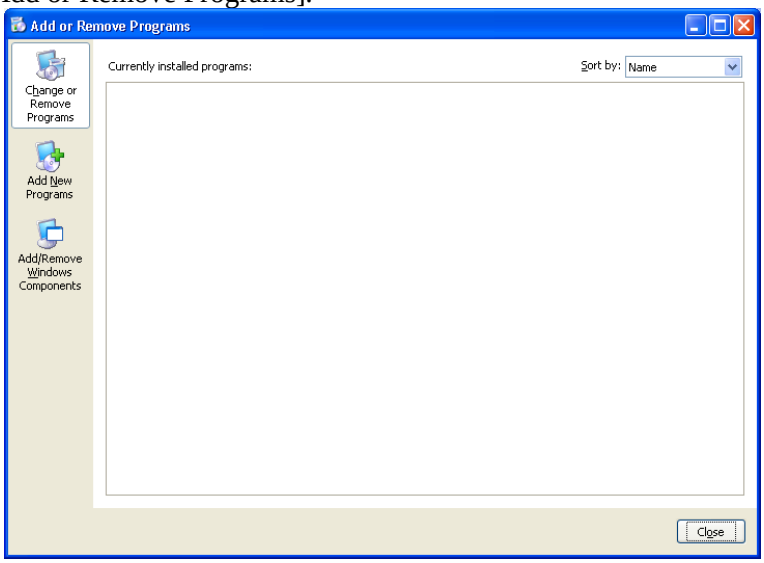
NOTE
Windows XP Home Edition does not have IIS (Internet Information Service).

Installing the Internet Information Service

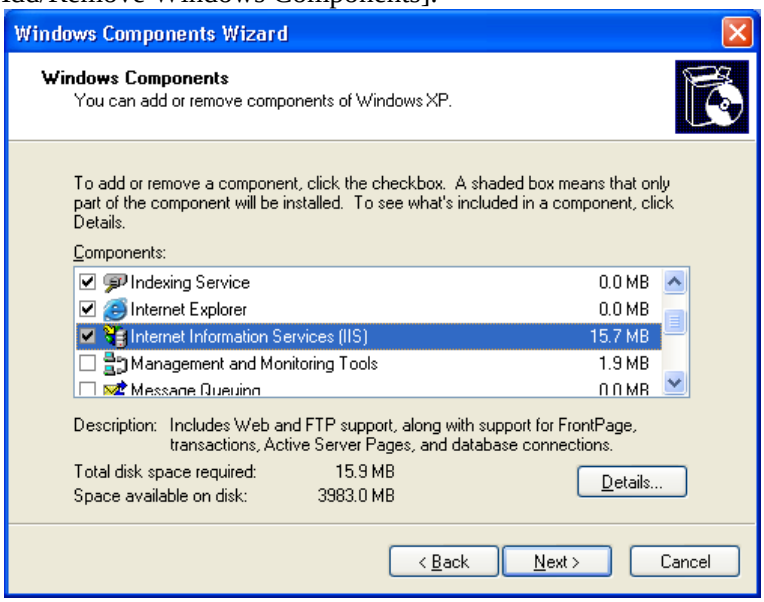
1. Open [Control Panel] of Windows XP Professional.



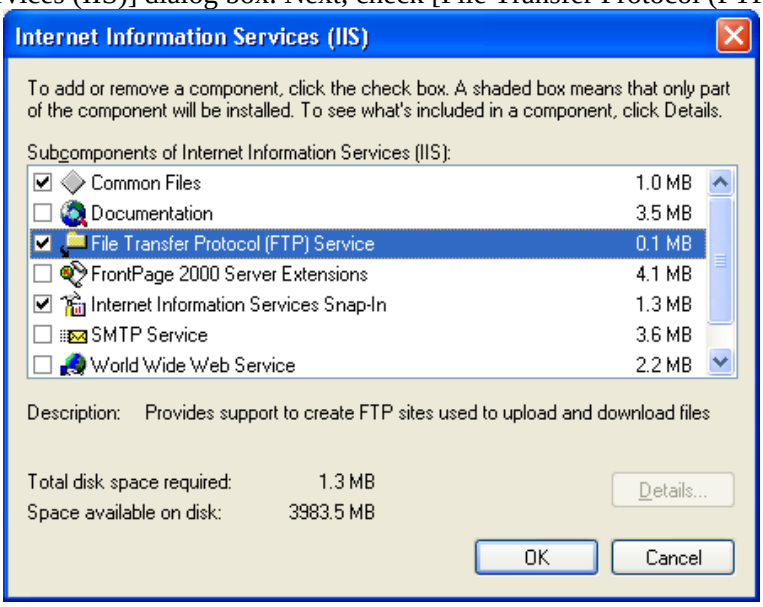
2. Double-click [Add or Remove Programs].



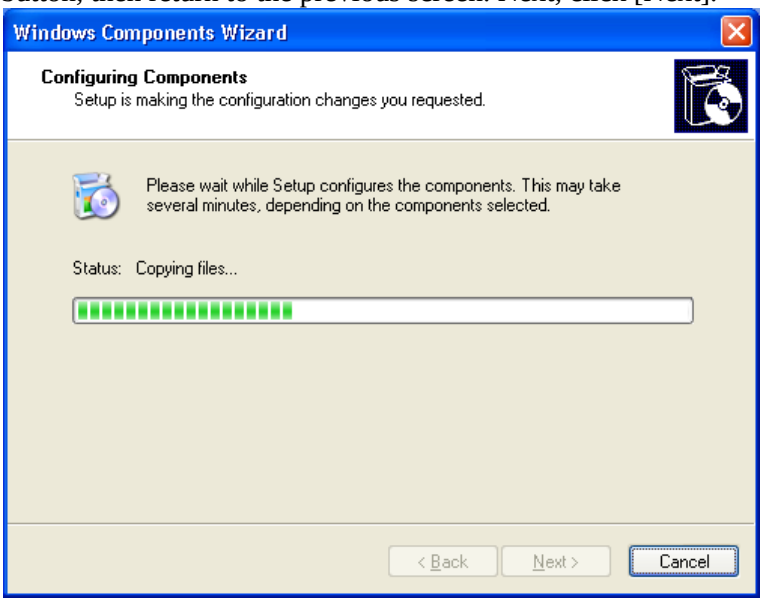
3. Double-click [Add/Remove Windows Components].



4. Select [Internet Information Services (IIS)], then click the [Details] button to display the [Internet Information Services (IIS)] dialog box. Next, check [File Transfer Protocol (FTP) Service].



5. Click the [OK] button, then return to the previous screen. Next, click [Next].



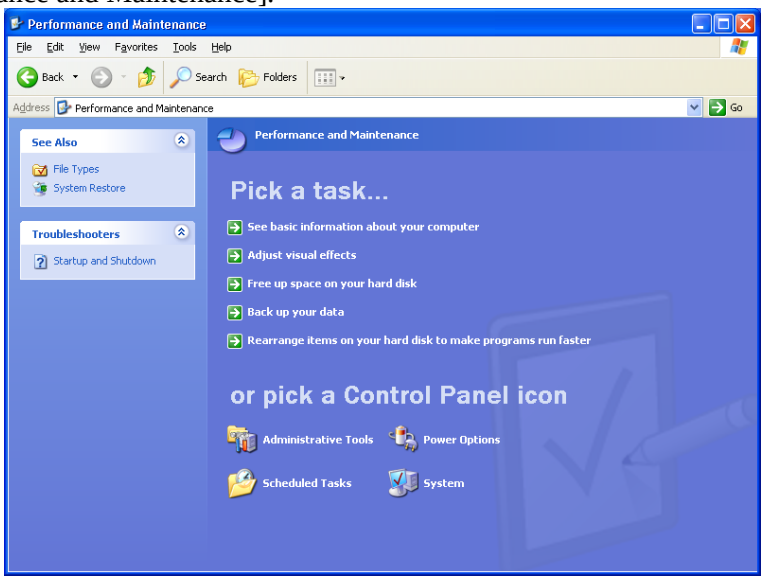
6. The dialog box above is displayed, and the necessary files are installed.

7. The installation is completed when the screen above is displayed.

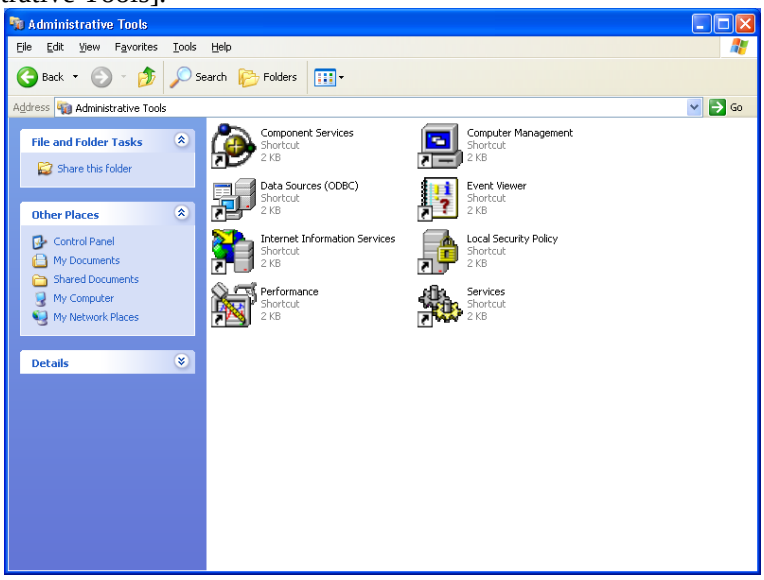
Setting the Internet Information Service

1. Open [Control Panel] of Windows XP Professional.

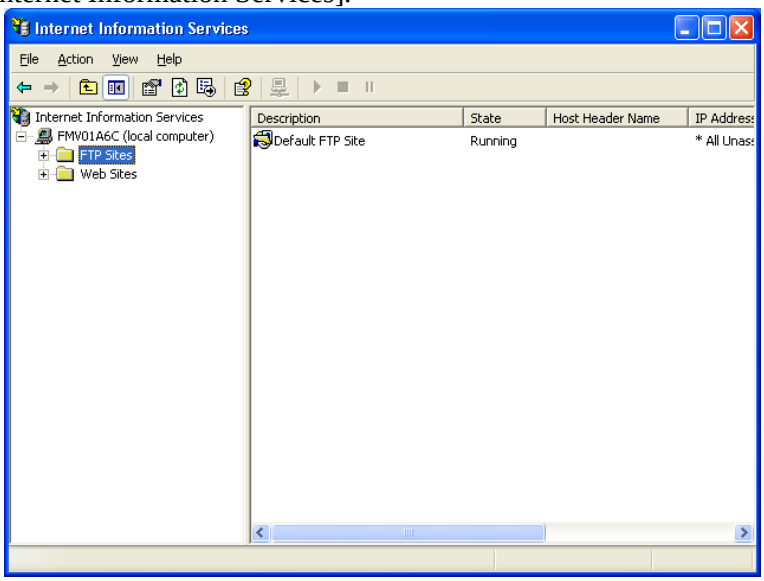
2. Click [Performance and Maintenance].



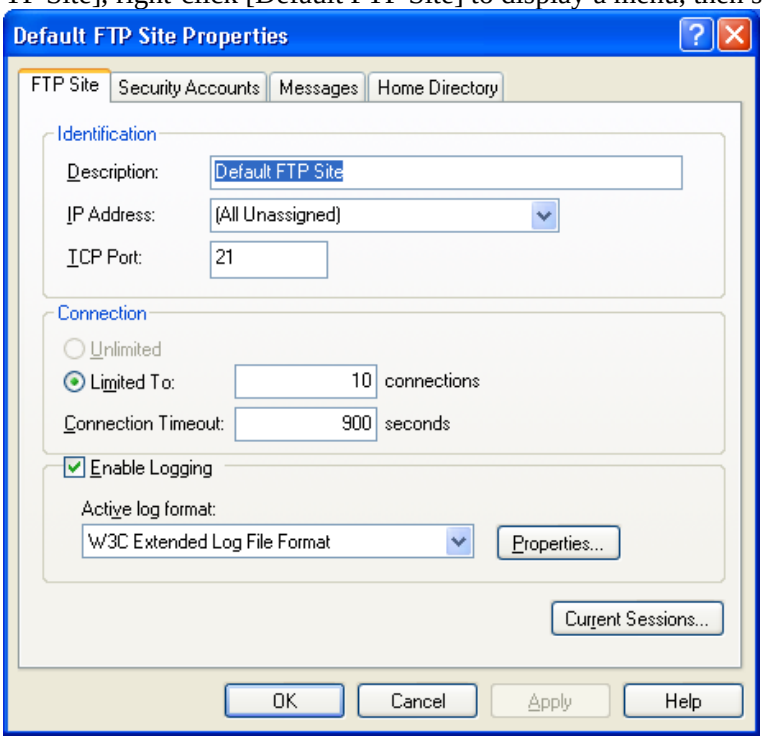
3. Click [Administrative Tools].



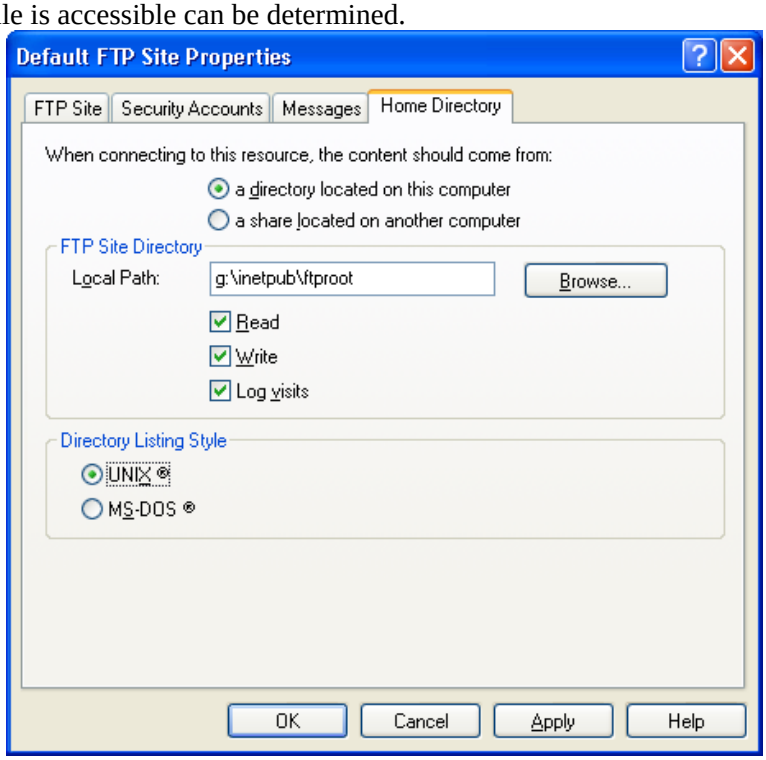
4. Double-click [Internet Information Services].



5. Double-click [FTP Site], right-click [Default FTP Site] to display a menu, then select Properties.



6. Select the [Home Directory] tab to display the [Home Directory] property sheet.
Check [Read] and [Write] in [FTP Site Directory]. In [Directory Listing Style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.



7. Then, click the [OK] button.
In the standard [Default FTP Site], the directory \Inetput\ftproot (on the drive where Windows XP is installed) is the home directory, and only the directories under the home directory can be accessed.

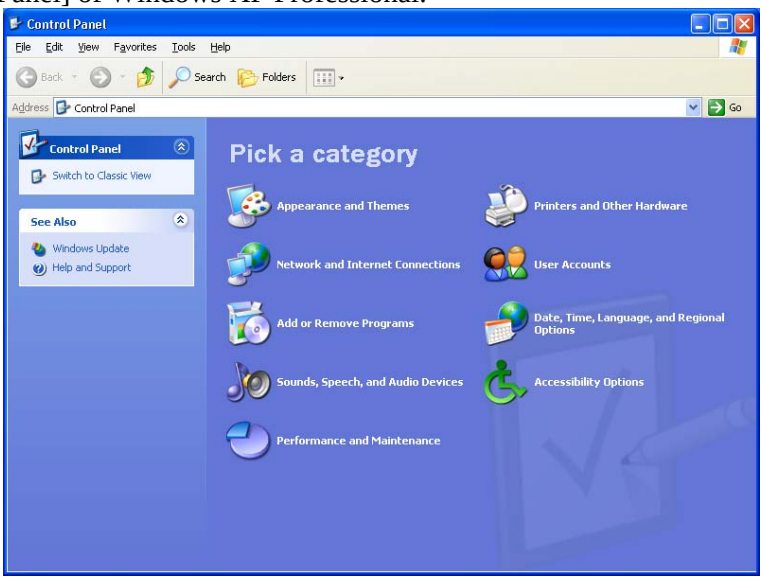
To use a directory other than the default directory as a home directory, modify the local path of [FTP Site Directory] mentioned in step 6 above.

8. To access a directory other than the directories under the home directory set in step 7 above, a virtual directory needs to be set.
For details of a virtual directory, use information such as the online help information of Windows XP.

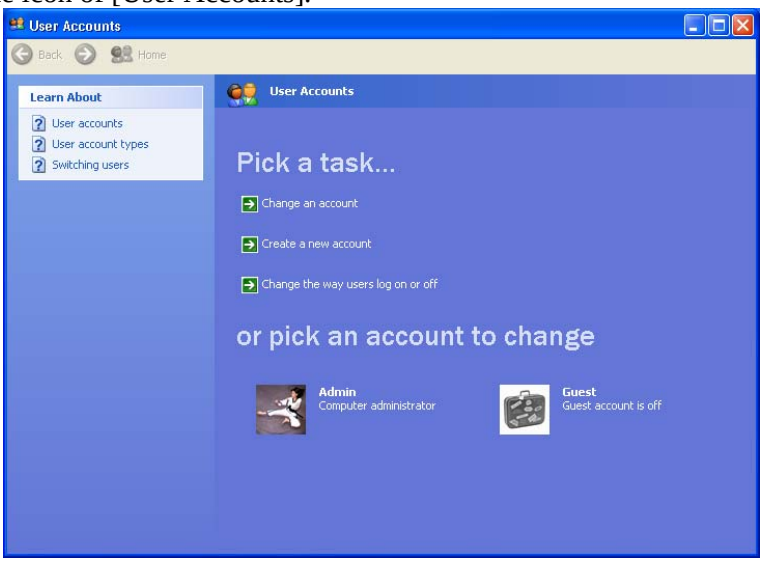
Login user setting

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

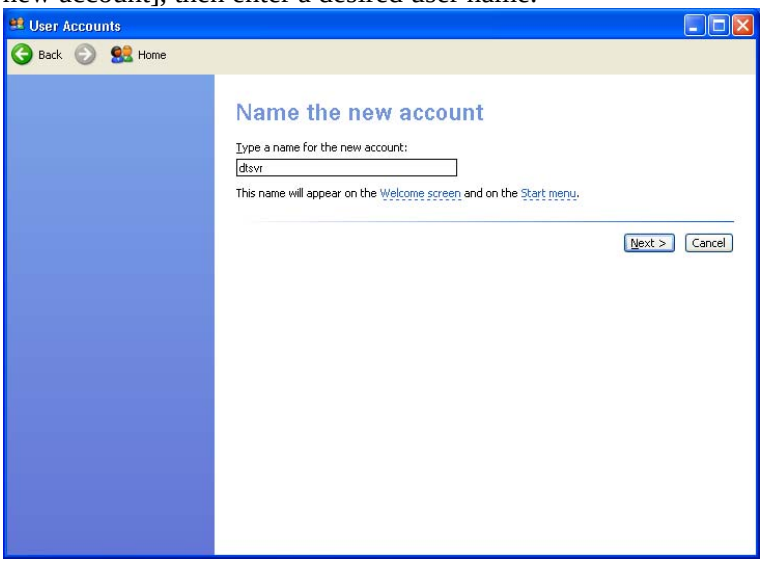
1. Open [Control Panel] of Windows XP Professional.



2. Double-click the icon of [User Accounts].



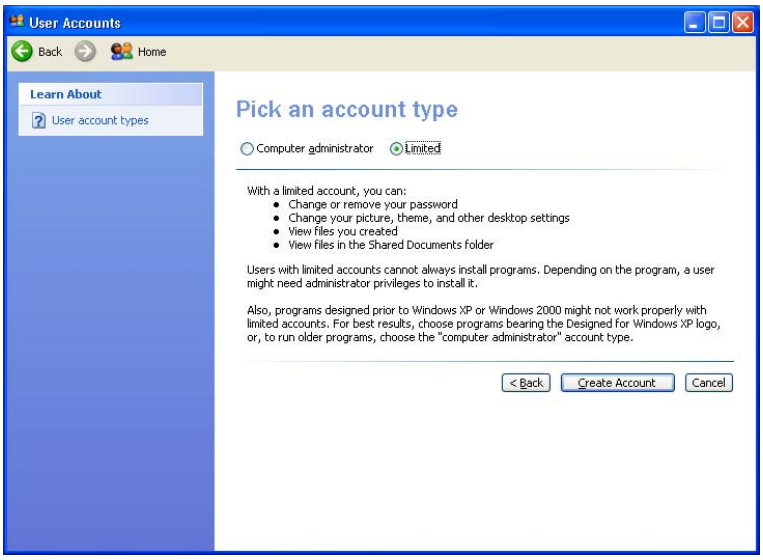
3. Click [Create a new account], then enter a desired user name.



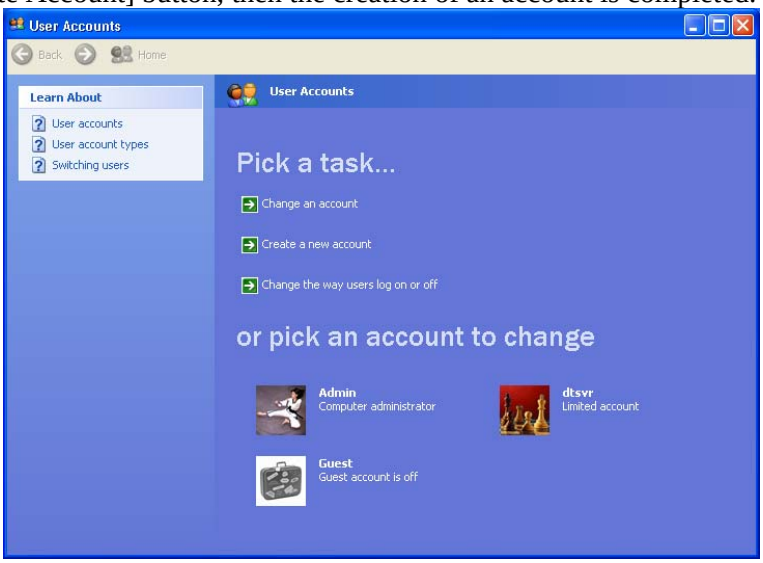
4. Click the [Next] button, then set an account type.
   The access right set here can affect the capability to read from and write to a file in FTP-based communication. Use care when setting an access right.

NOLTE

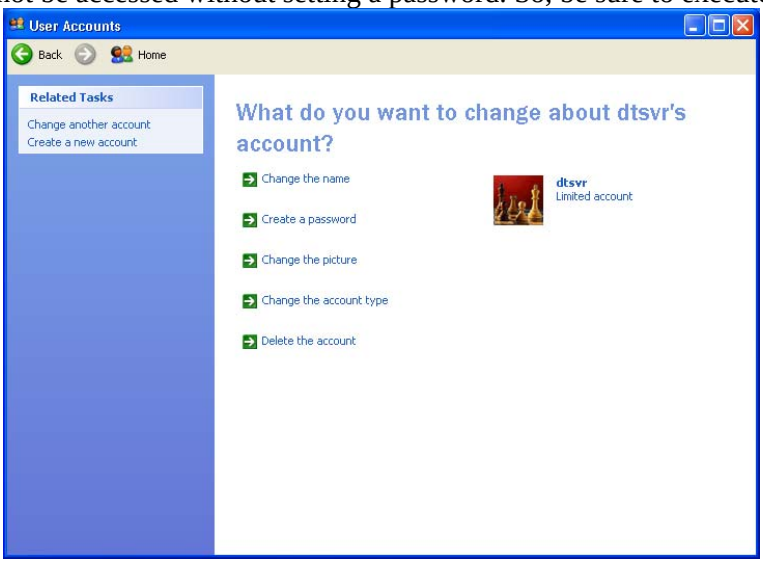
If the type of account is not to be changed to Administrator, a file may not be able to be read or written with the account. In this case, grant an access right to read and write the home directory set in steps 6 and 7 in "Setting the Internet Information Service" described above to the user account.



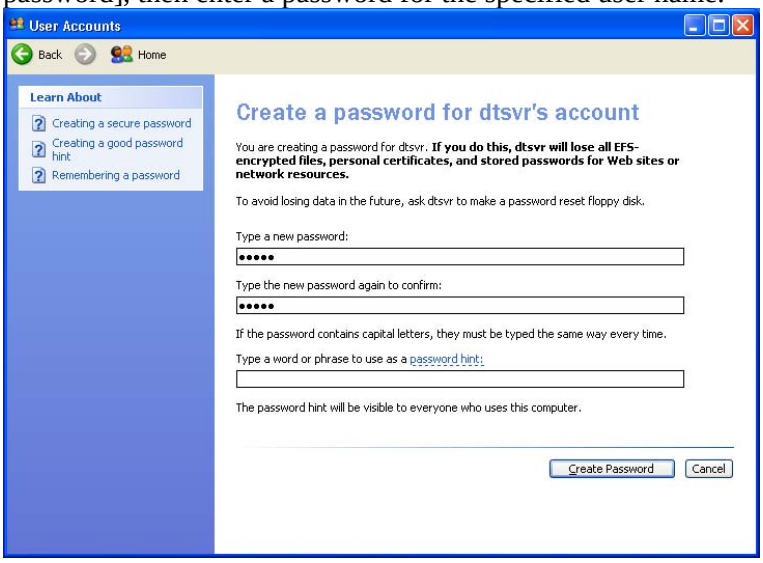
5. Click the [Create Account] button, then the creation of an account is completed.



6. For password setting, click the previously created account in [or pick an account to change]. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)



7. Click [Create a password], then enter a password for the specified user name.

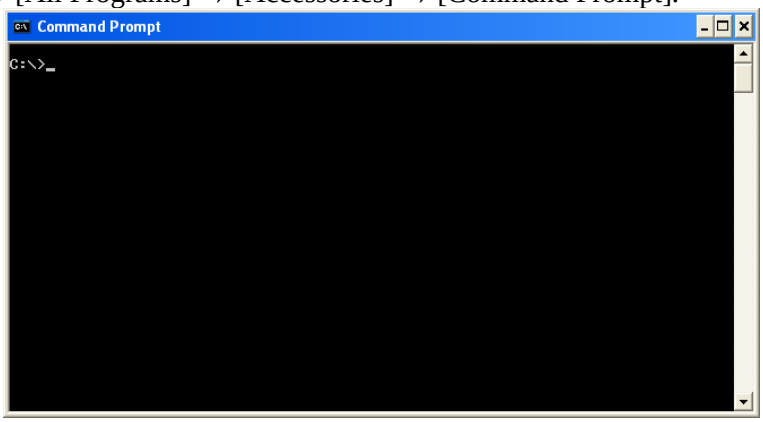


8. Click the [Create Password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.

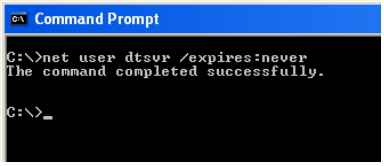
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password.
If you are necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

1. Select [Start] → [All Programs] → [Accessories] → [Command Prompt].



2. Input “net user login-user /expires:never”.



3. If the above message is displayed, the password expiration is stopped.

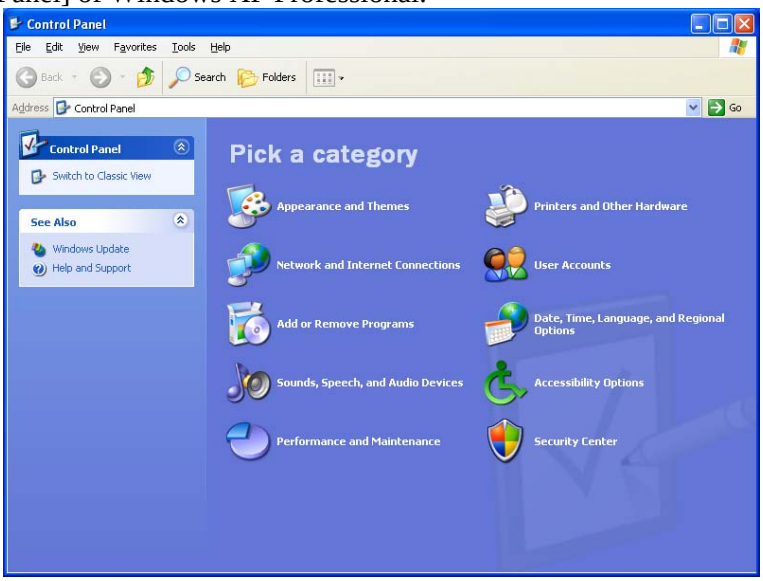
Confirming the Firewall function of Windows XP

Because the Internet Connection Firewall function is included in the Windows XP Professional, the Data Server cannot communicate with the FTP server.
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

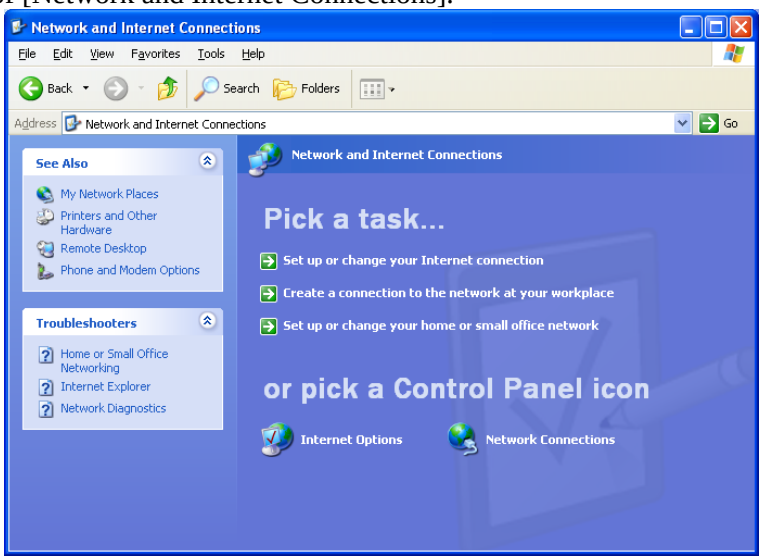
NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.
Therefore, when making the following settings, consult with your network administrator, and take special care.
In some cases, it becomes necessary to isolate the network from the outside as required.

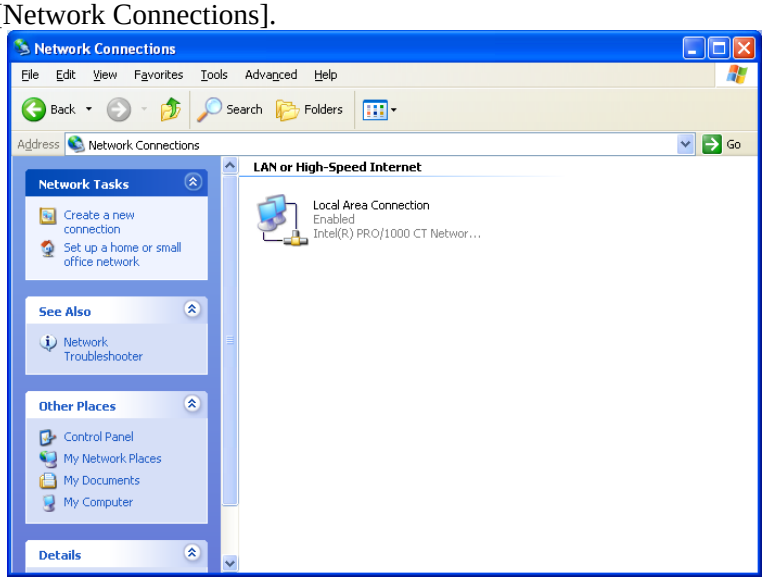
1. Open [Control Panel] of Windows XP Professional.



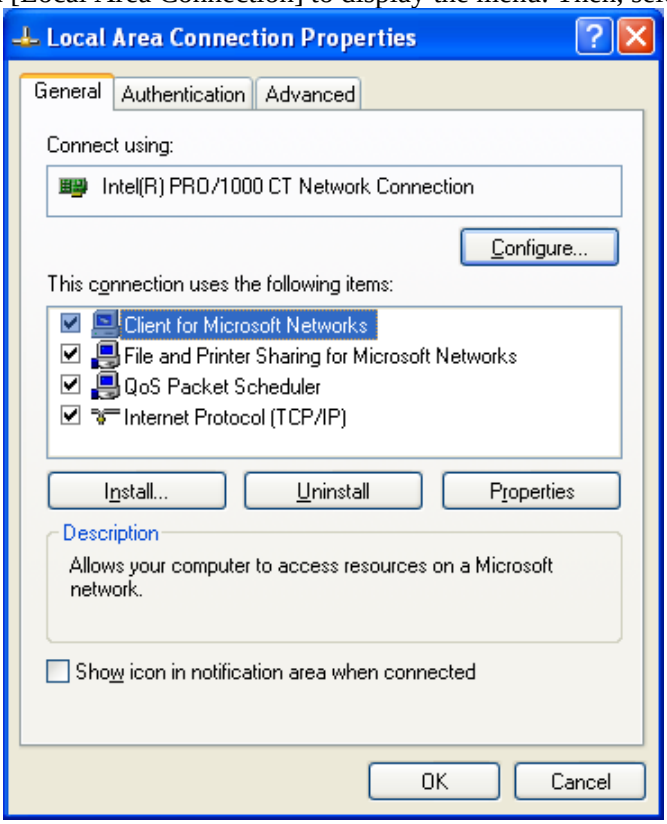
2. Click the icon of [Network and Internet Connections].



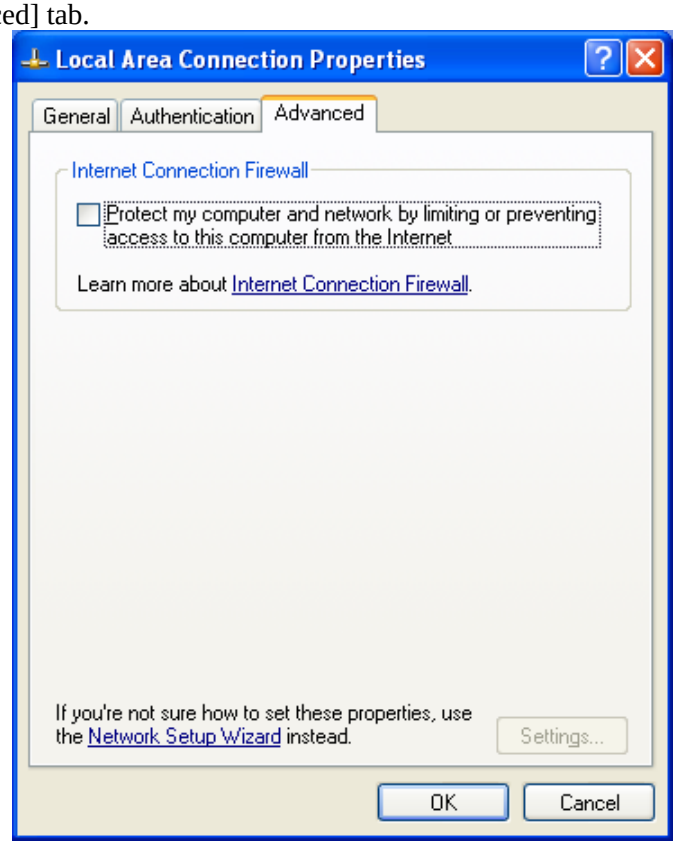
3. Click the icon [Network Connections].



4. Right-click the icon [Local Area Connection] to display the menu. Then, select Properties.

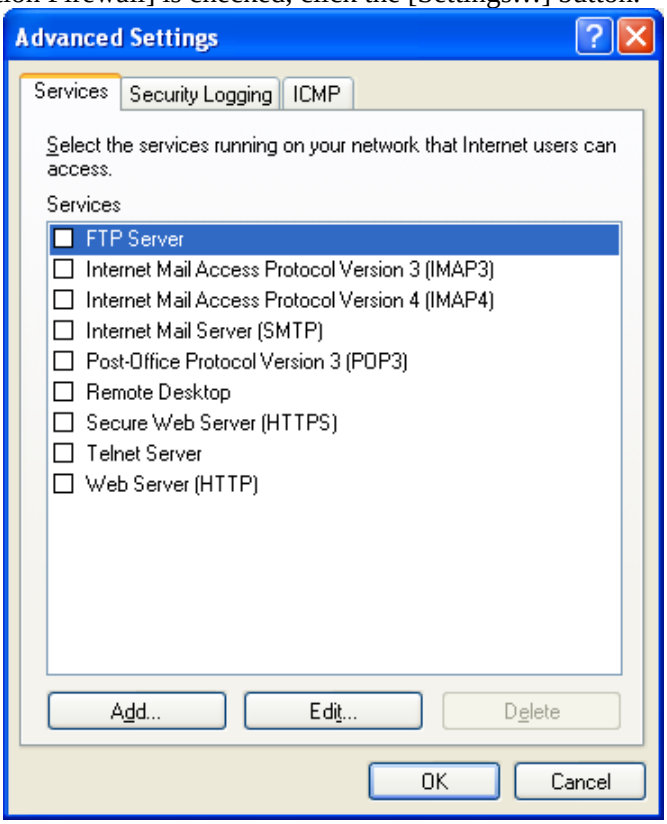


5. Select the [Advanced] tab.

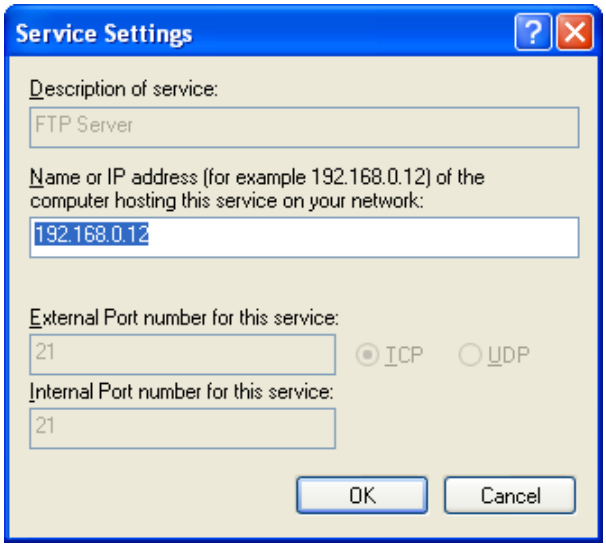


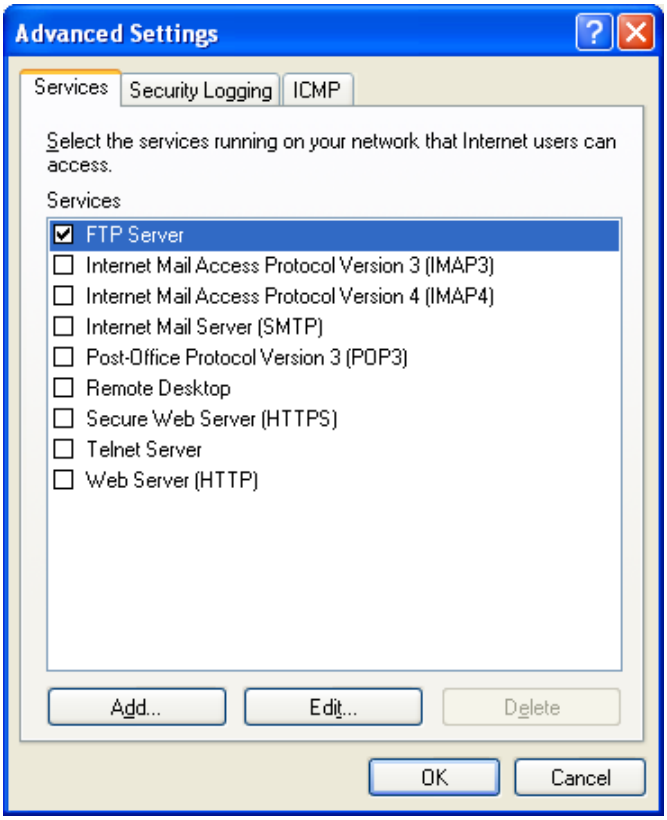
6. If [Internet Connection Firewall] is not checked, the Internet Connection Firewall function does not work. Then, the following confirmations are not necessary.

7. If [Internet Connection Firewall] is checked, click the [Settings…] button.

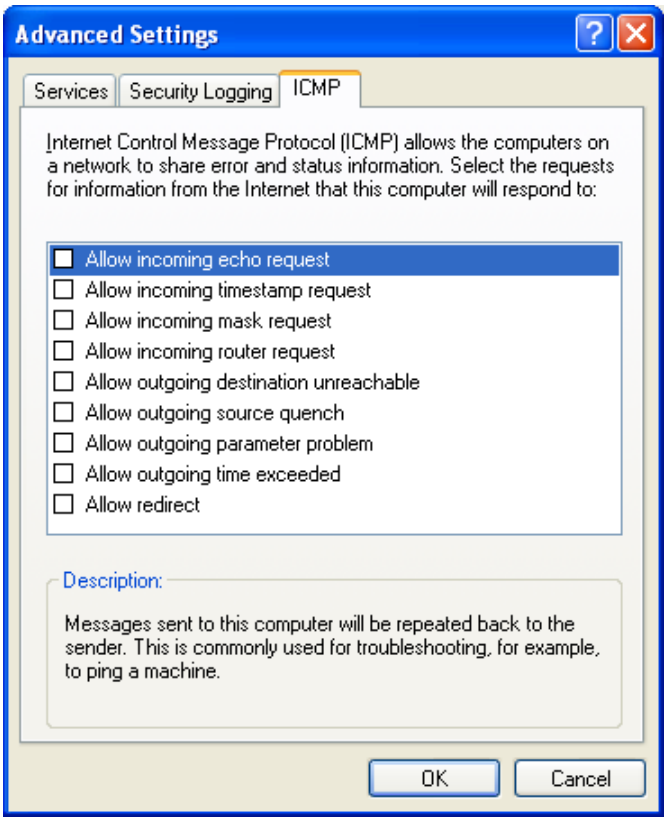


8. If the [FTP Server] check-box is not checked, the FTP server function does not work. Check the [FTP Server] check-box.
When the [FTP Server] check-box is checked, the following window is displayed. Then, click the [OK] button.

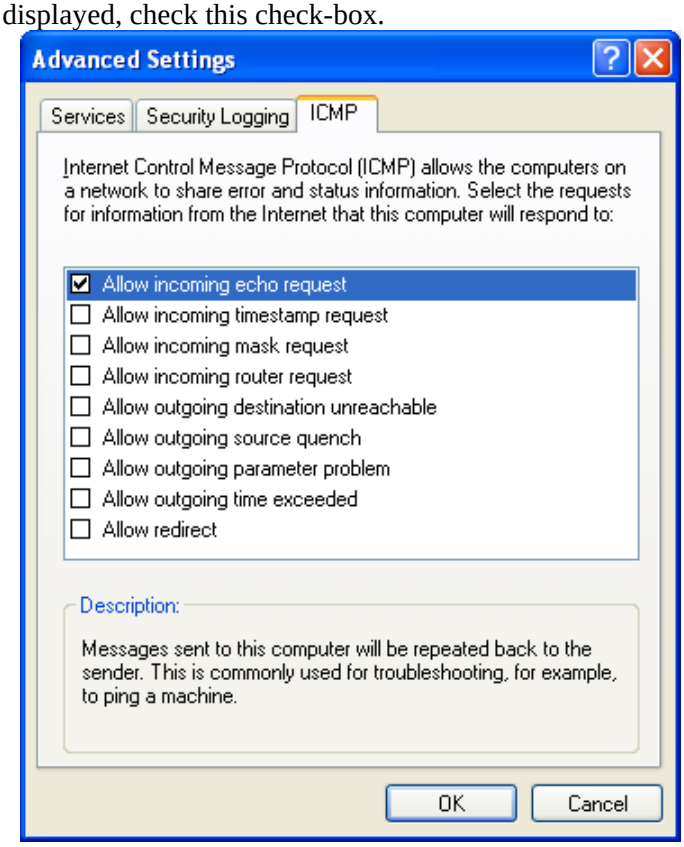




9. Select the [ICMP] tab.



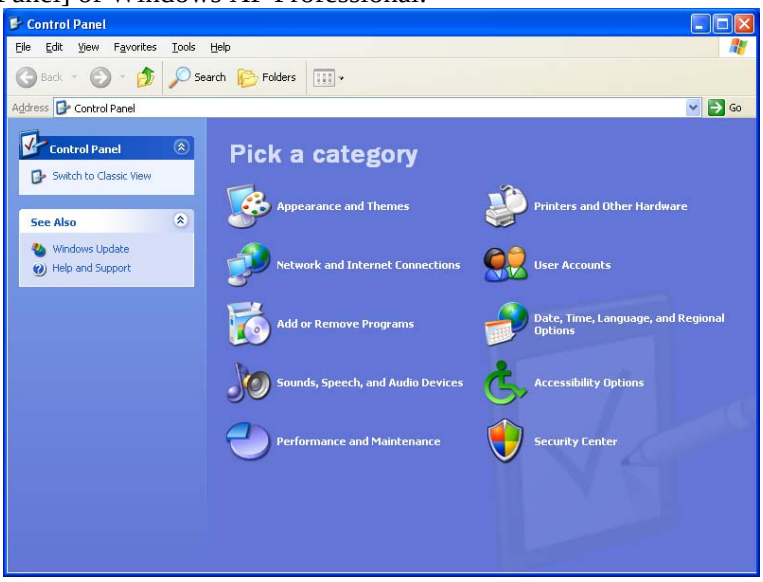
10. If the [Allow incoming echo request] check-box is not checked, the Data Server function cannot find the FTP server at the start of communication.
    At the start of communication of Data Server, if the message "[FTP] (IP-address) IS NOT AVAILABLE" is displayed, check this check-box.



Confirming the firewall function when Windows XP (Service Pack 2) is used

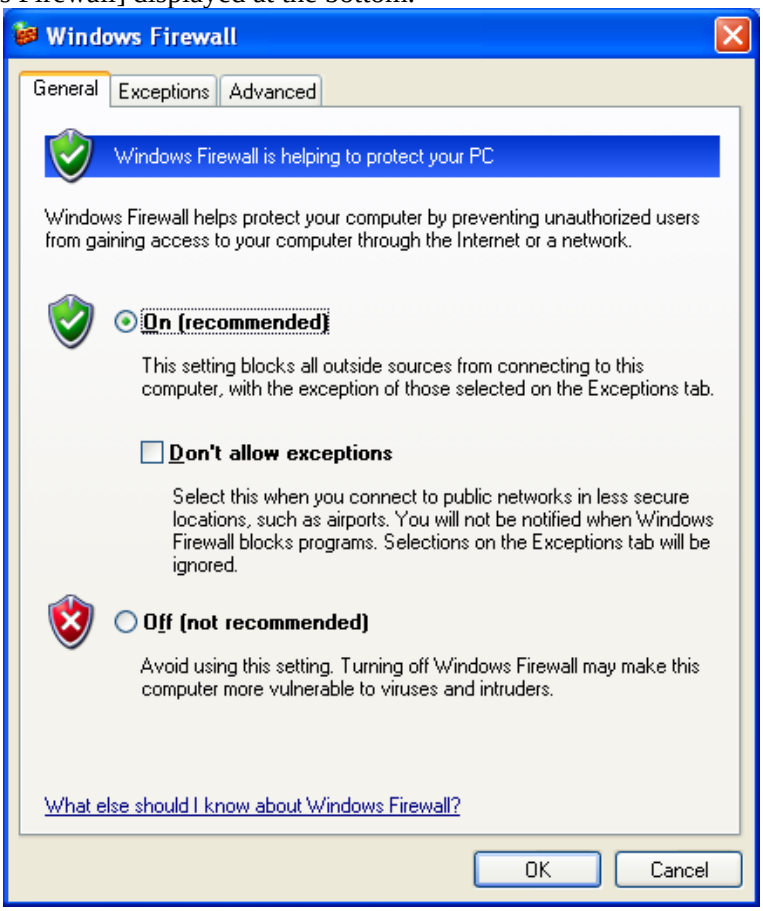
When Windows XP Professional (Service Pack 2) is used, a different firewall setting procedure is used.

1. Open [Control Panel] of Windows XP Professional.

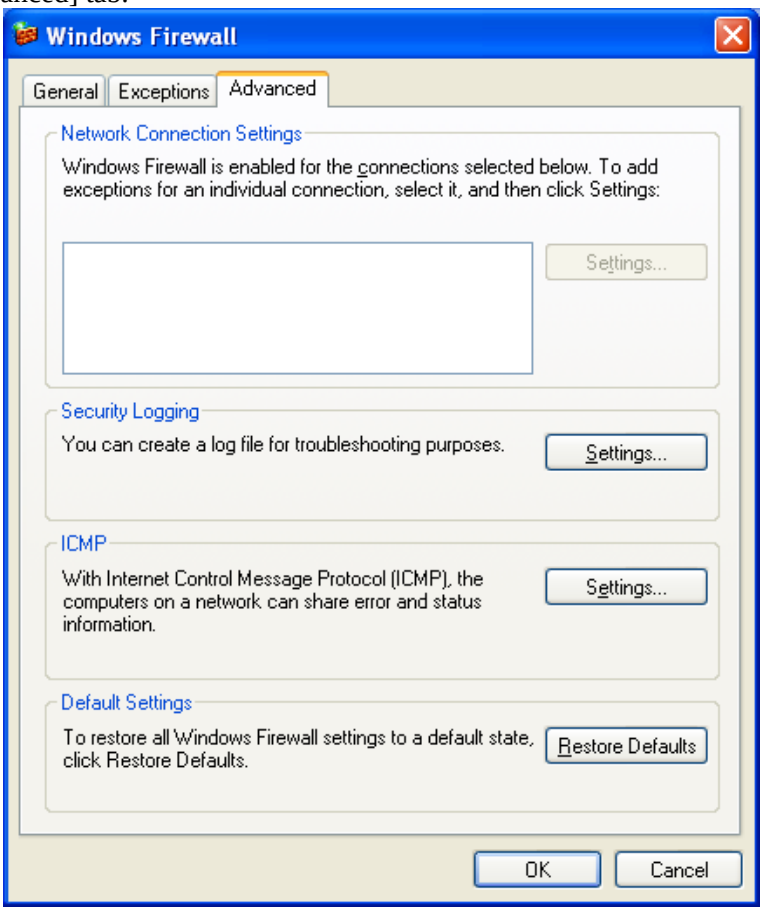


2. Double-click [Security Center] to start it.

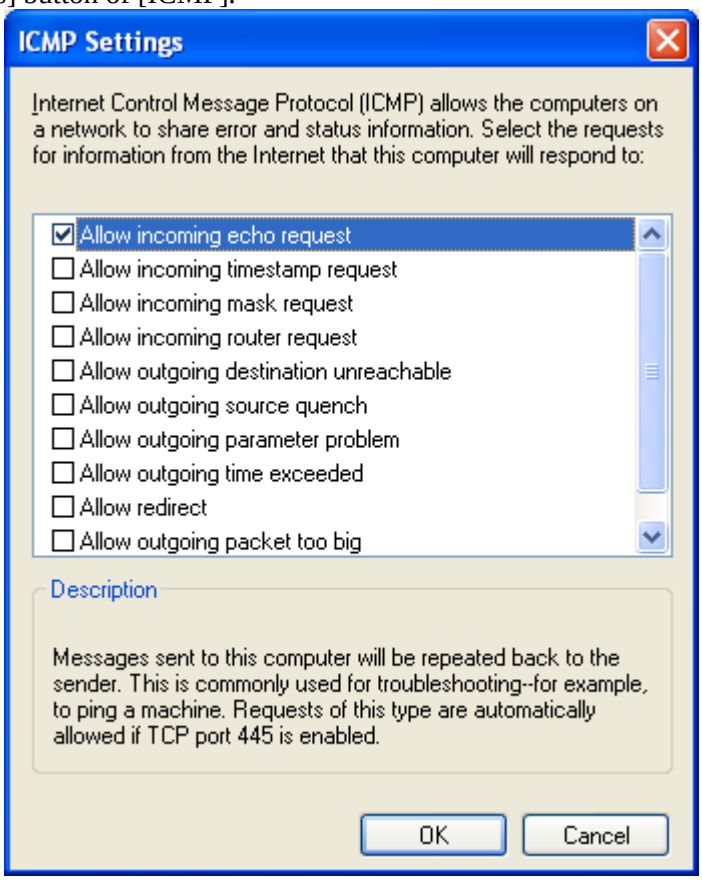
3. Click [Windows Firewall] displayed at the bottom.



4. Select the [Advanced] tab.

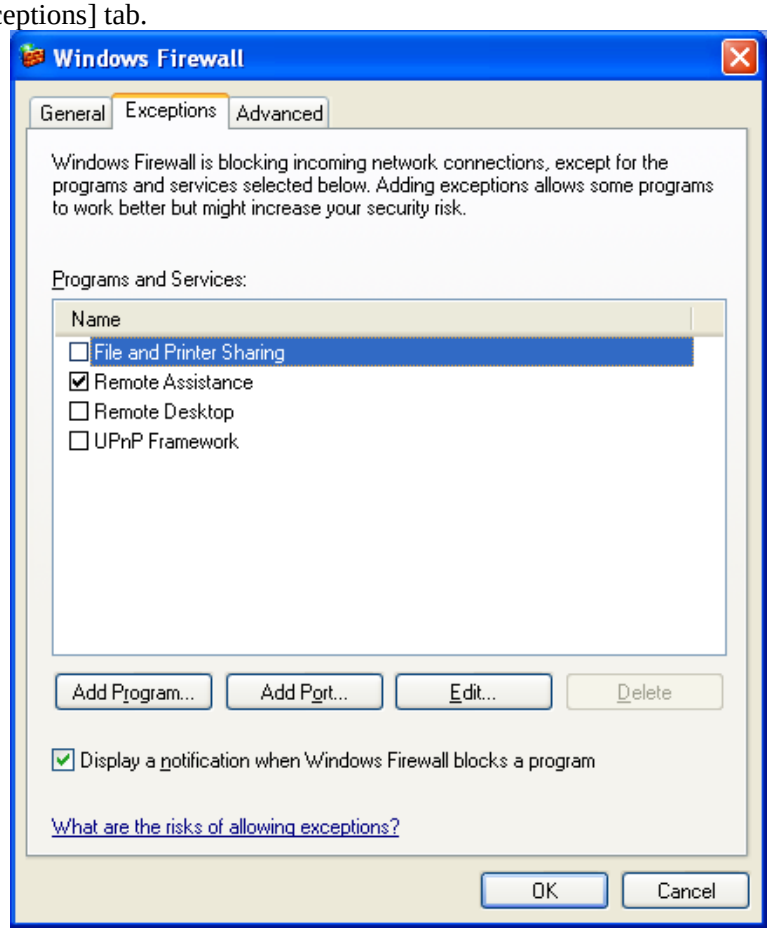


5. Click the [Settings] button of [ICMP].

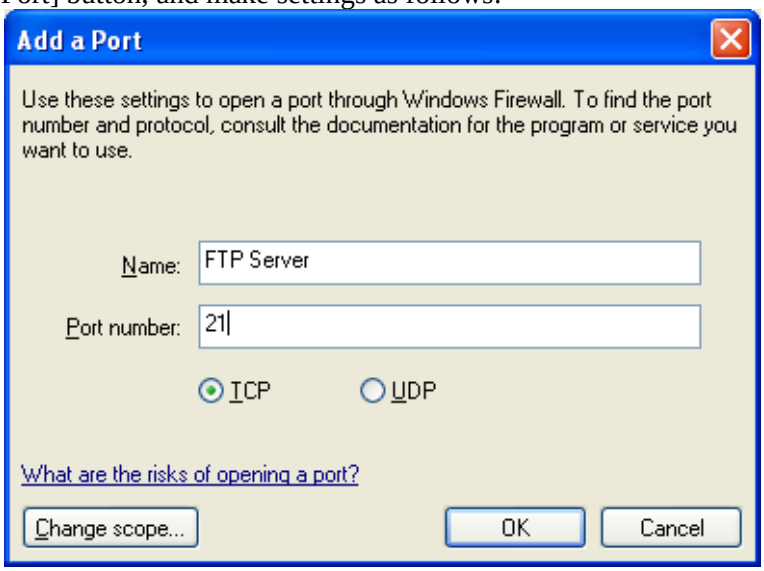


6. If [Allow incoming echo request] is not checked, check it, and click the [OK] button.
   This allows a response to be made to PING from other devices.

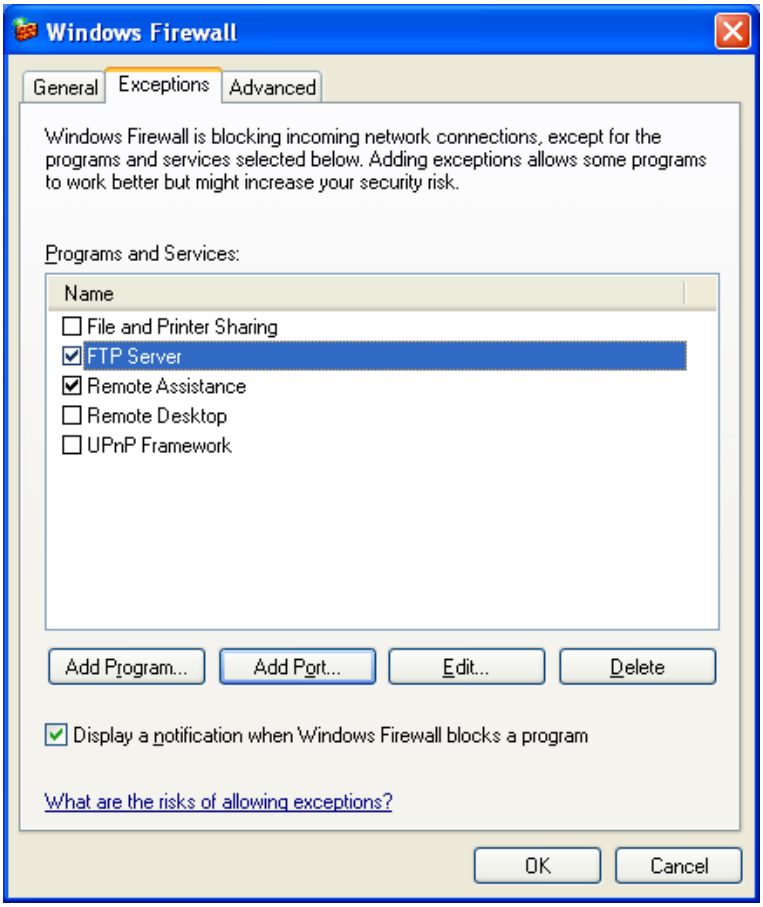
7. Select the [Exceptions] tab.



8. Click the [Add Port] button, and make settings as follows:



9. Click the [OK] button.



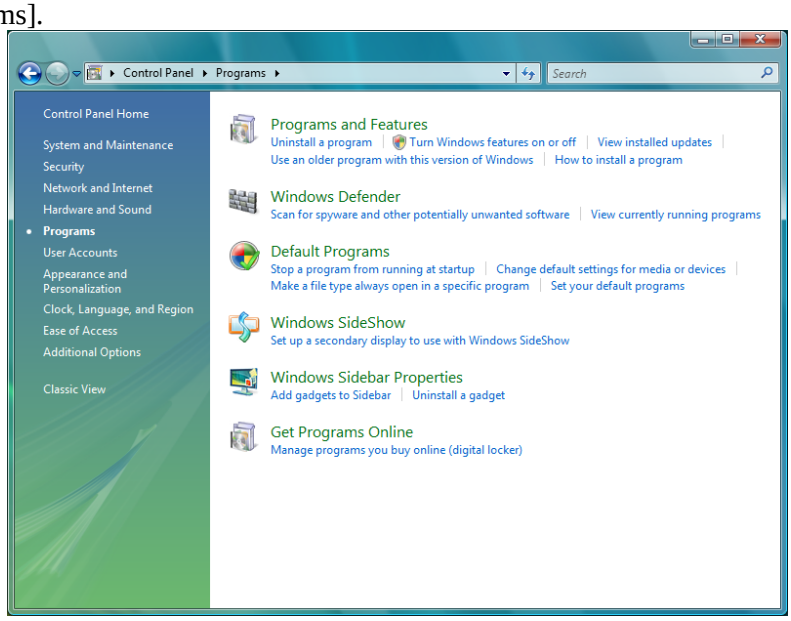
B.3 SETTING UP FTP SERVER OF Windows Vista (FOR INTERNET INFORMATION SERVICE)

NOTE
Windows Vista Home Basic and Windows Vista Home Premium do not have IIS (Internet Information Service).

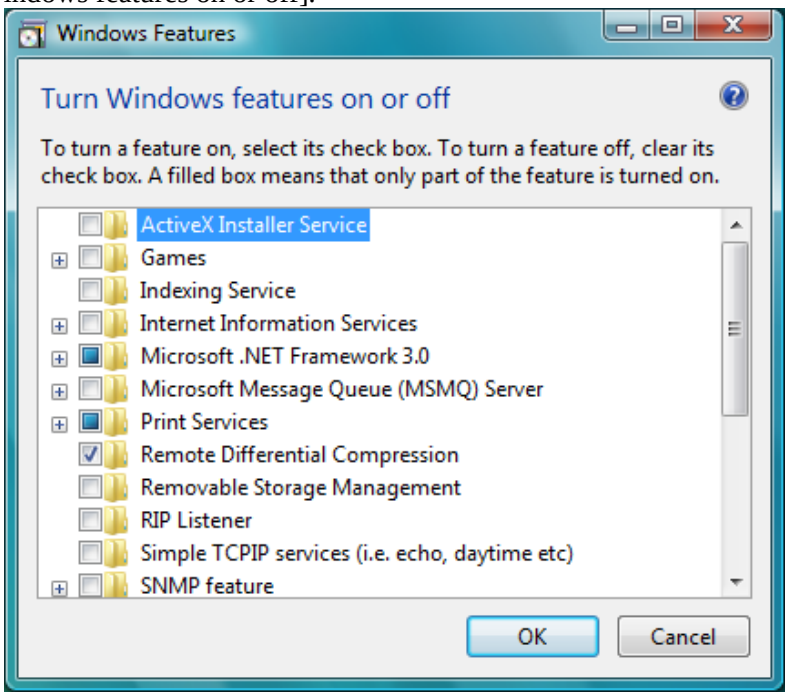
Installing the Internet Information Service

1. Open [Control Panel] of Windows Vista.

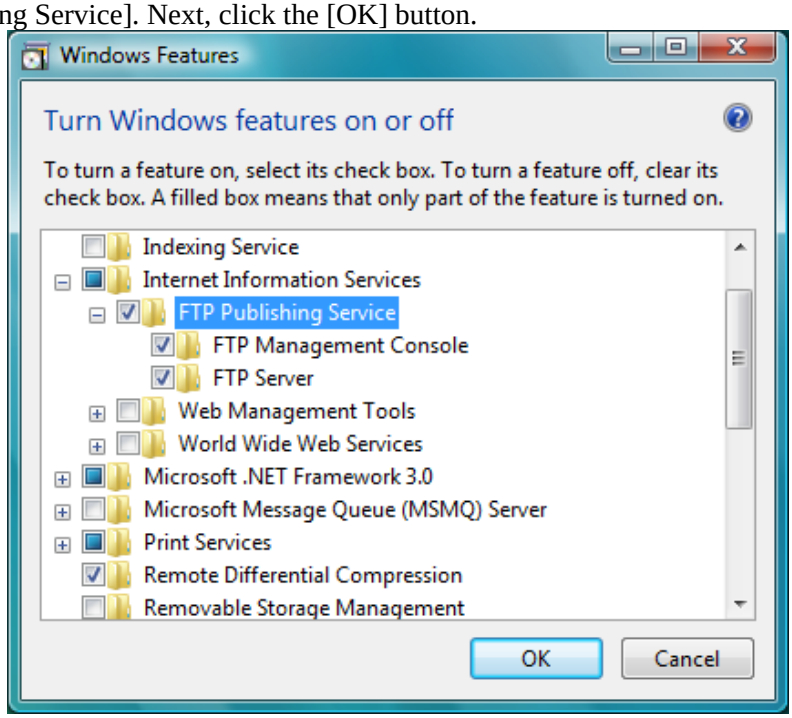
2. Click [Programs].



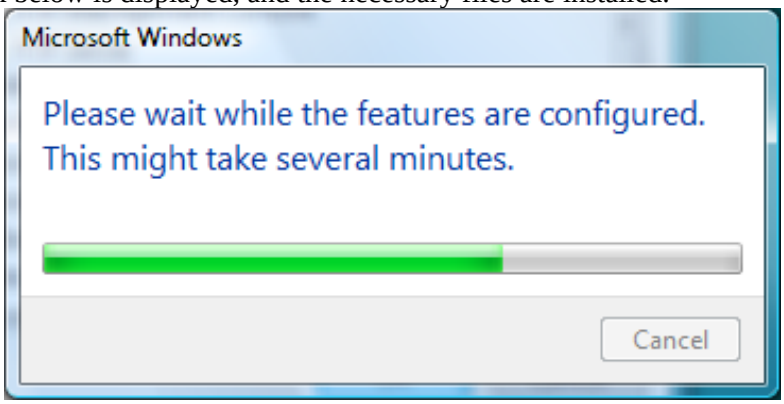
3. Click [Turn Windows features on or off].



4. Expand [Internet Information Services], then check [FTP Management Console] and [FTP Server] in [FTP Publishing Service]. Next, click the [OK] button.



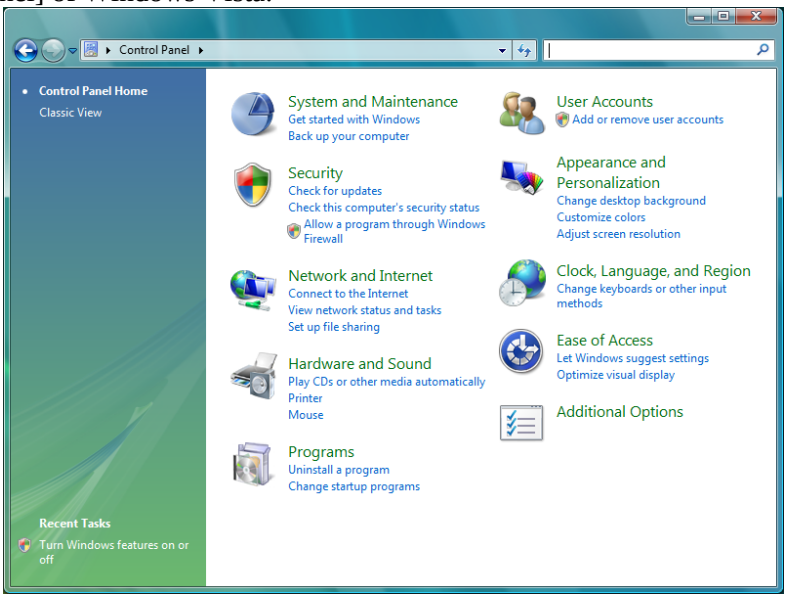
5. The dialog box below is displayed, and the necessary files are installed.



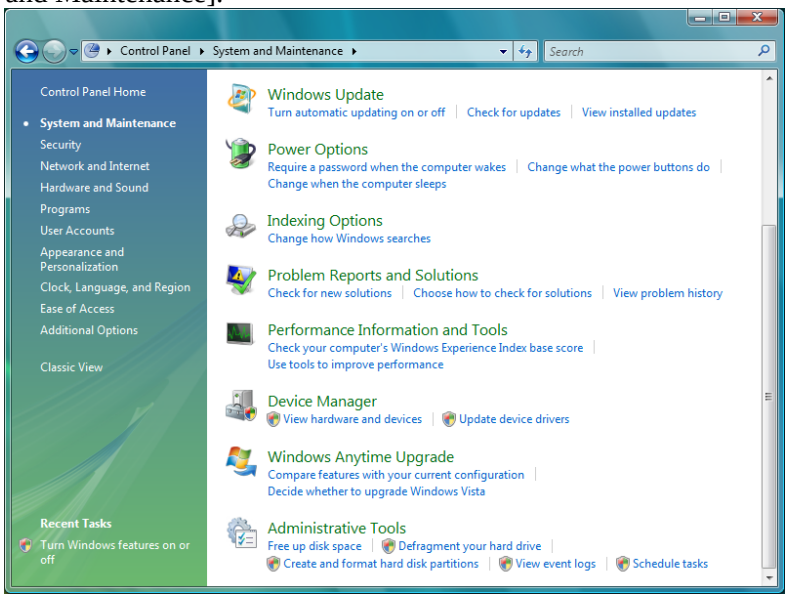
6. The installation is completed when the dialog box above and [Windows Features] dialog box are finished.

Setting the Internet Information Service

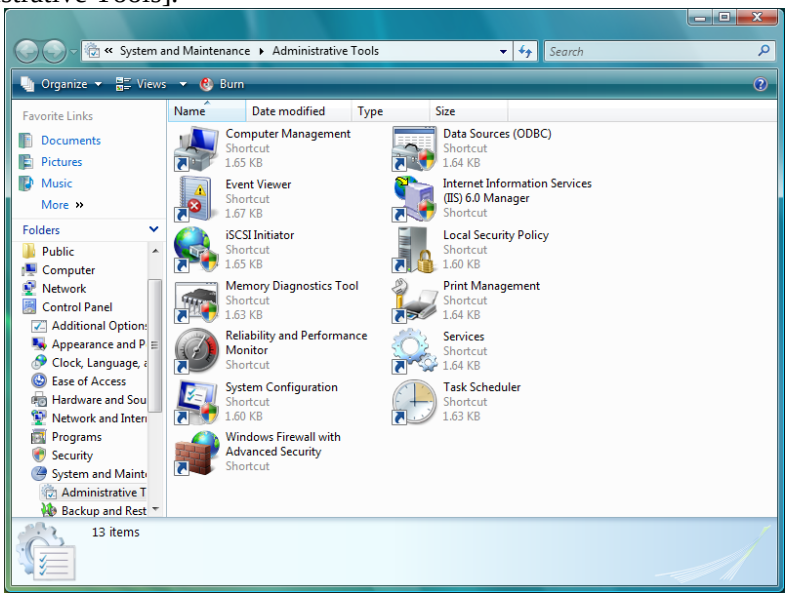
1. Open [Control Panel] of Windows Vista.



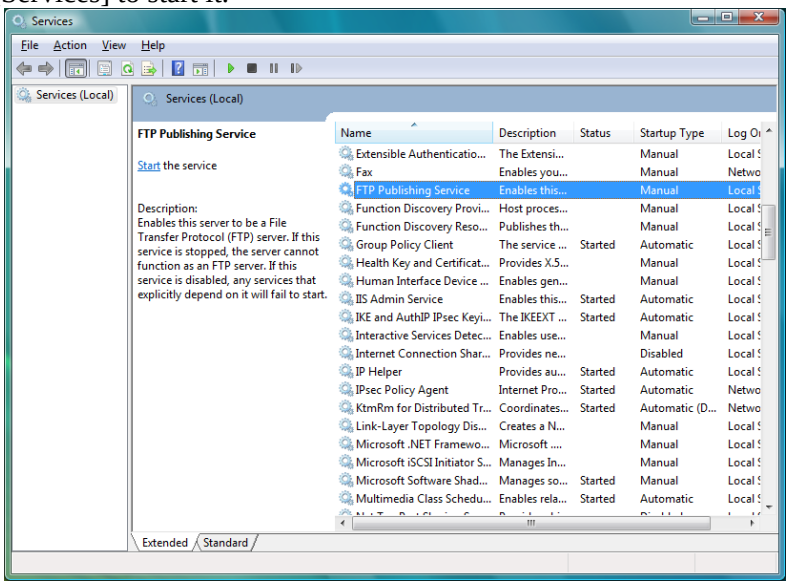
2. Click [System and Maintenance].



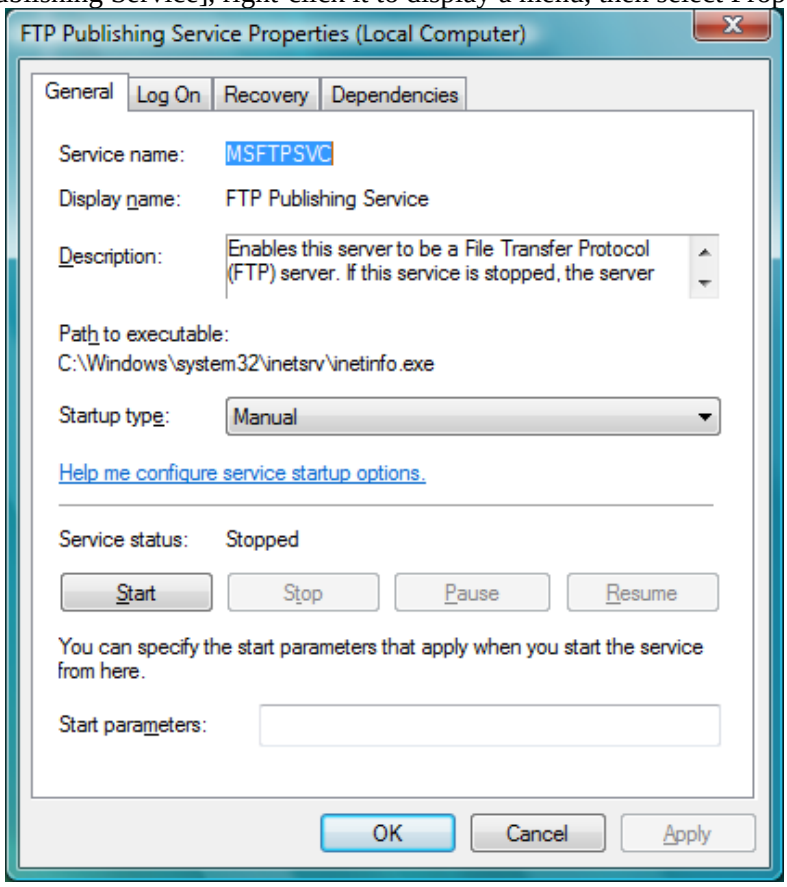
3. Click [Administrative Tools].



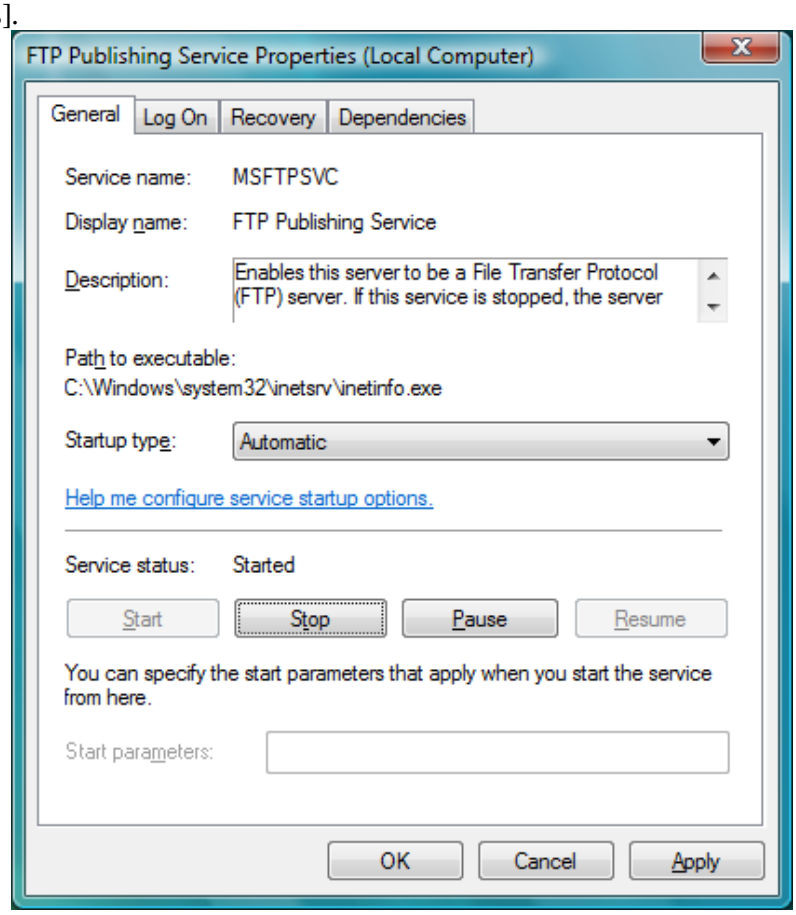
4. Double-click [Services] to start it.



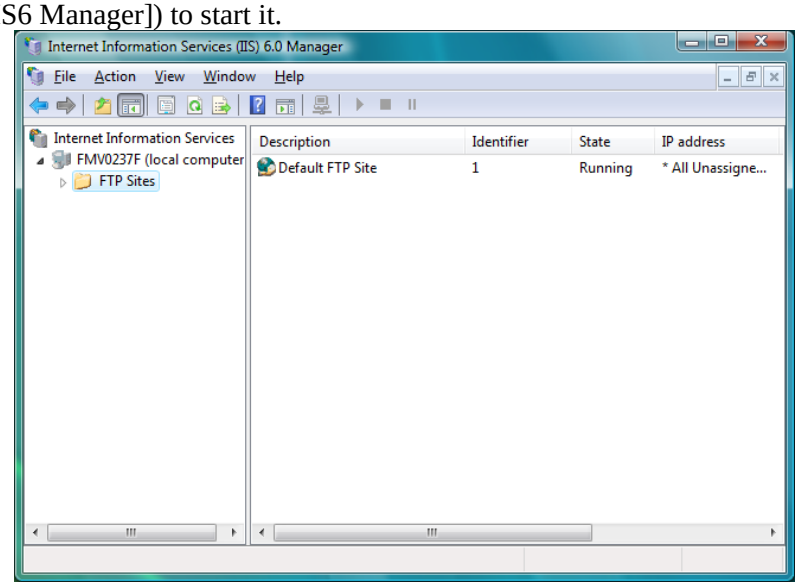
5. Select [FTP Publishing Service], right-click it to display a menu, then select Properties.



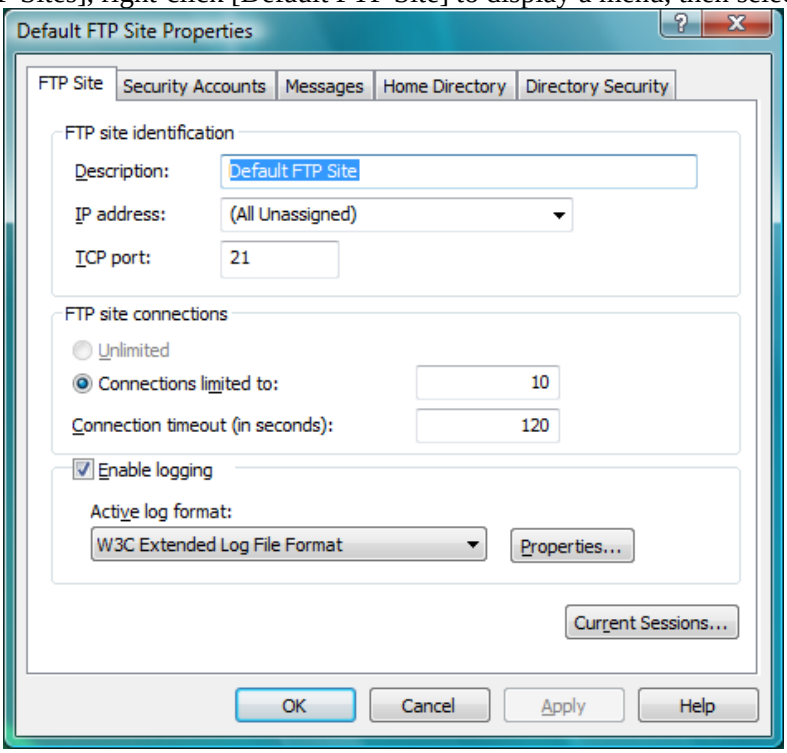
6. Display the [General] property sheet.
   Change [Manual] to [Automatic] in [Startup type] and click the [Start] button in [Service status], then click the [OK] button.
   End [Services].



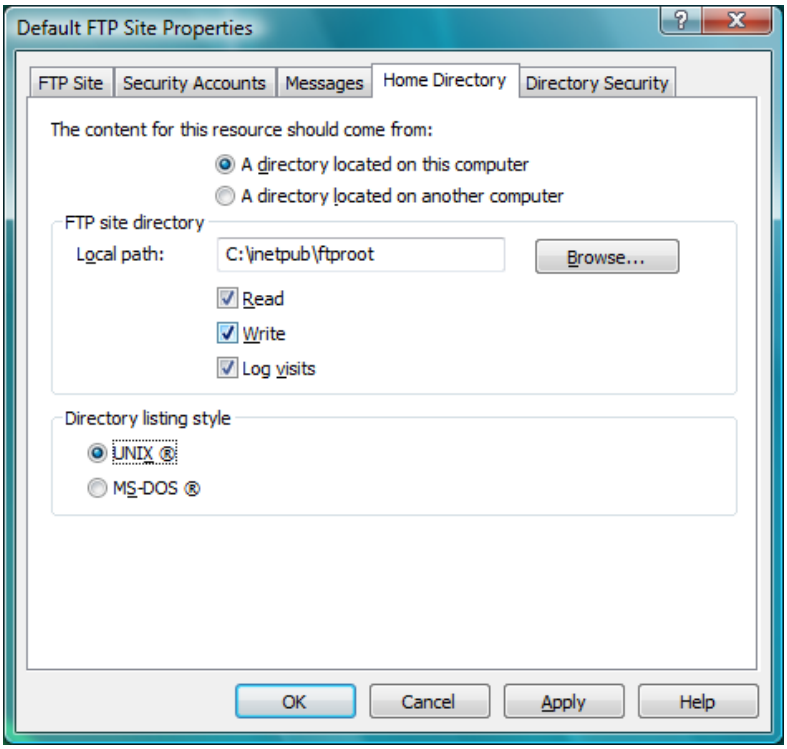
7. Return to [Administrative Tools], then Double-click [Internet Information Services (IIS) 6.0 Manager] ([IIS6 Manager]) to start it.



8. Double-click [FTP Sites], right-click [Default FTP Site] to display a menu, then select Properties.



9. Select the [Home Directory] tab to display the [Home Directory] property sheet.
Check [Read] and [Write] in [FTP site directory]. In [Directory listing style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.



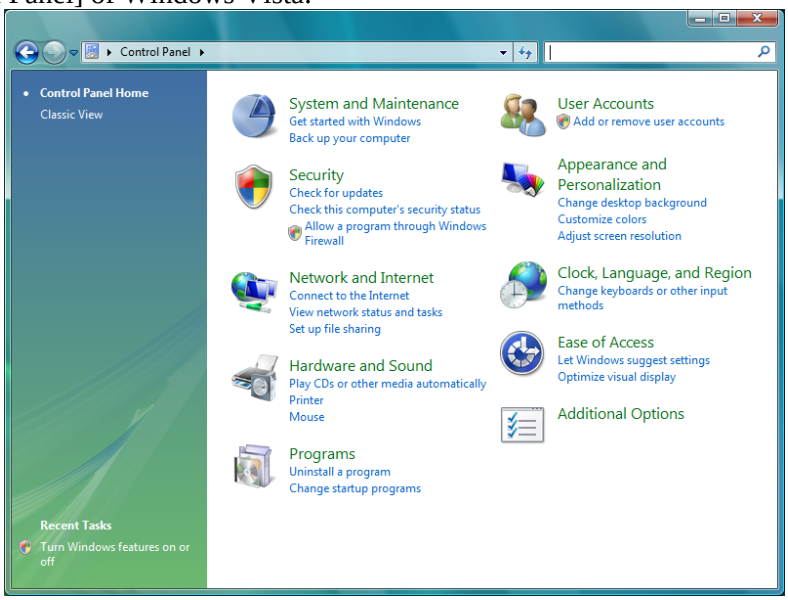
10. Then, click the [OK] button.
    In the standard [Default FTP Site], the directory \inetpub\ftproot (on the drive where Windows Vista is installed) is the home directory, and only the directories under the home directory can be accessed. To use a directory other than the default directory as a home directory, modify the local path of [FTP site directory] mentioned in step 9 above.

11. To access a directory other than the directories under the home directory set in step 10 above, a virtual directory needs to be set.
    For details of a virtual directory, use information such as the online help information of Windows Vista.

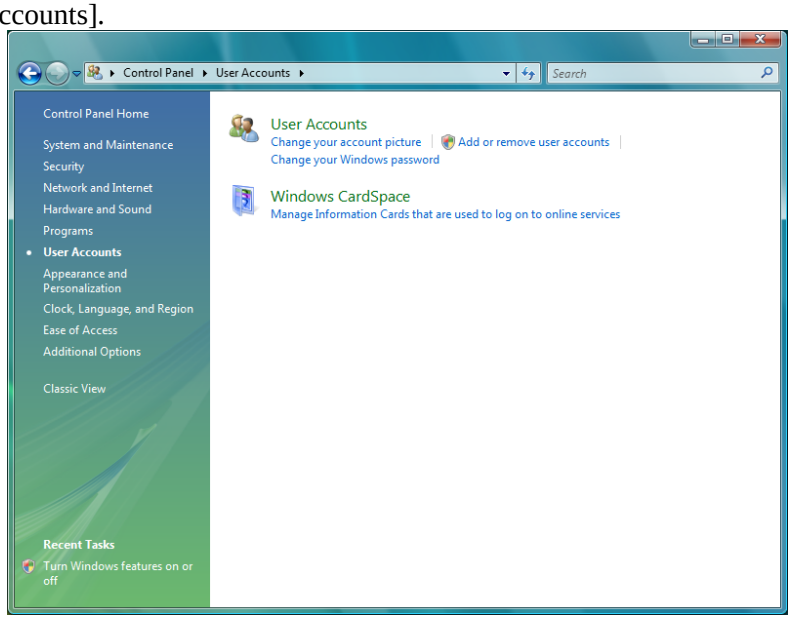
Login User Setting

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

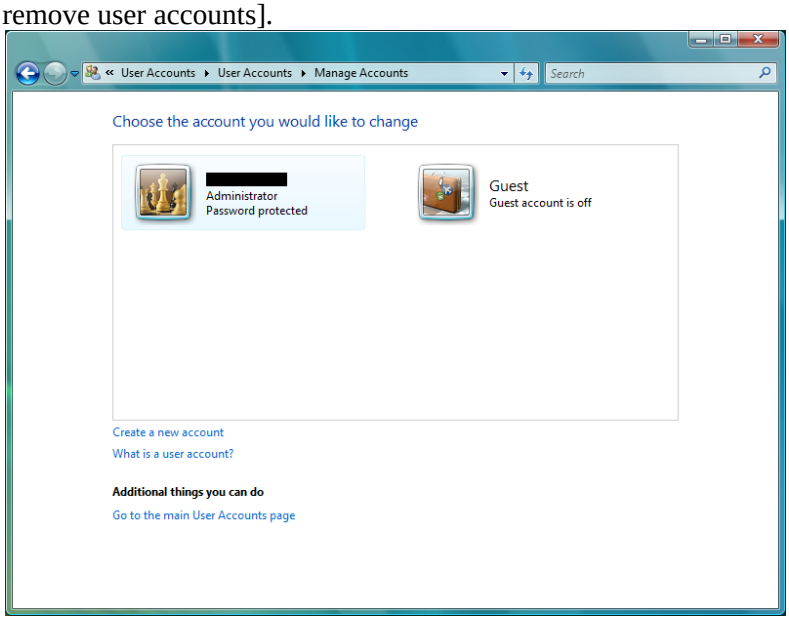
1. Open [Control Panel] of Windows Vista.



2. Click [User Accounts].



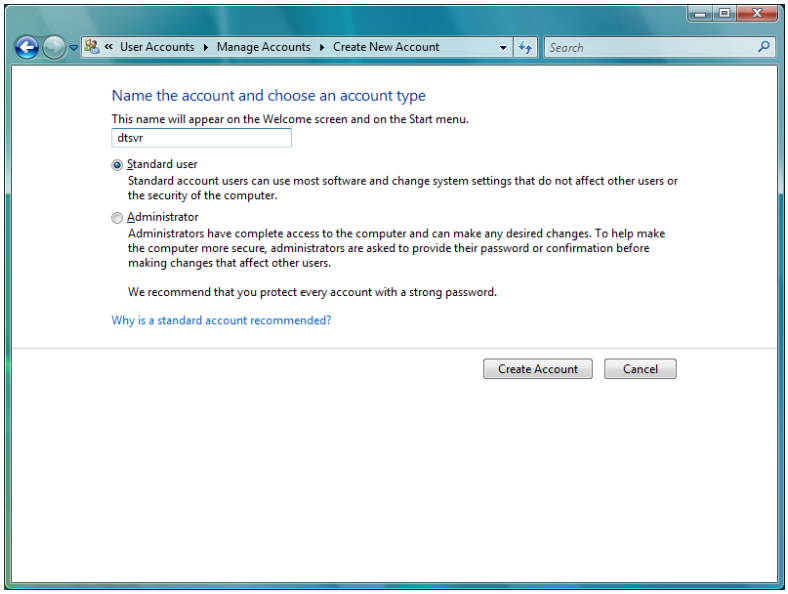
3. Click [Add or remove user accounts].



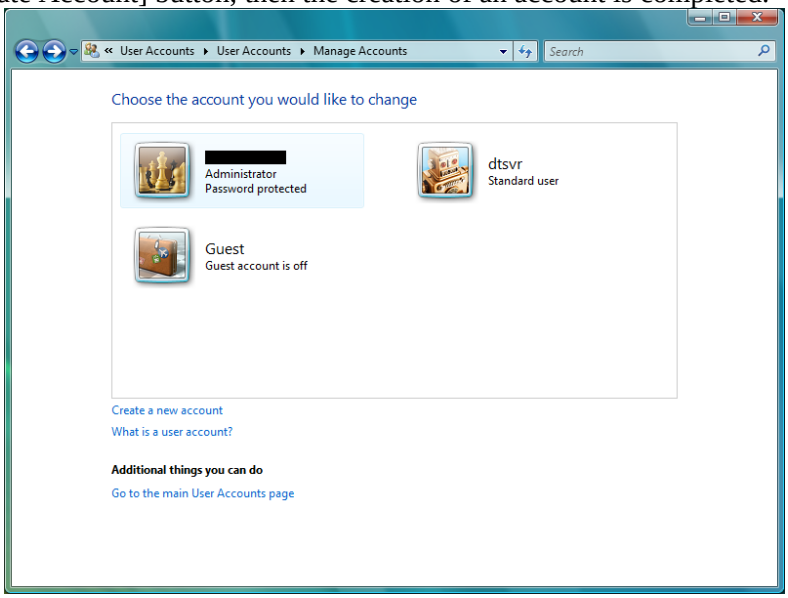
4. Click [Create a new account], then enter a desired user name and set an account type.
The access right set here can affect the right to read from and write to a file in FTP-based communication. Use care when setting an access right.

NOTE

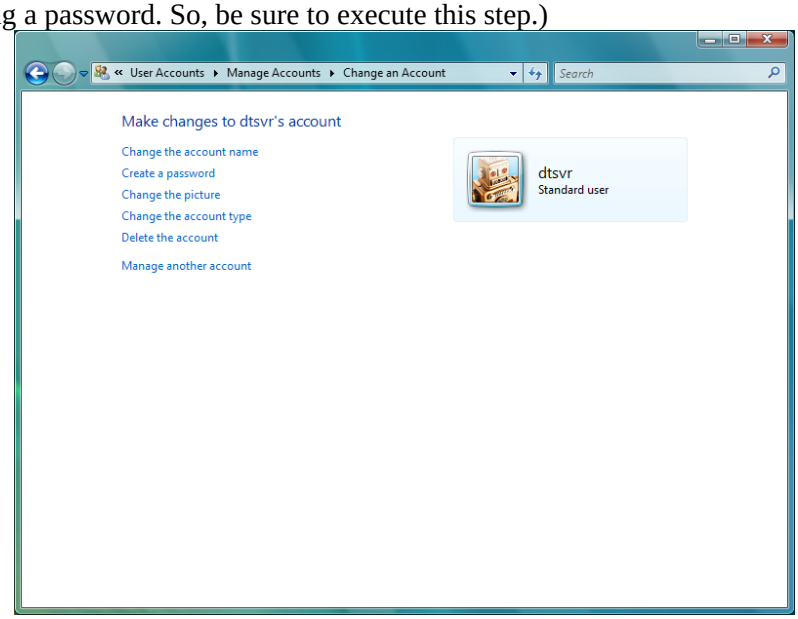
If the type of account is not to be changed to Administrator, a file may not be able to be read or written with the account. In this case, grant an access right to read and write the home directory set in steps 9 and 10 in "Setting the Internet Information Service" described above to the user account.



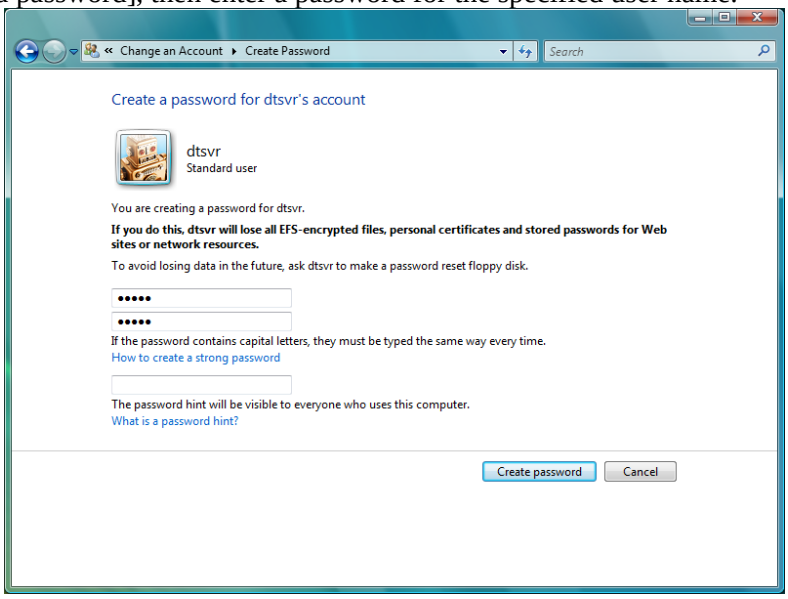
5. Click the [Create Account] button, then the creation of an account is completed.



6. For password setting, click the previously created account. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)



7. Click [Create a password], then enter a password for the specified user name.

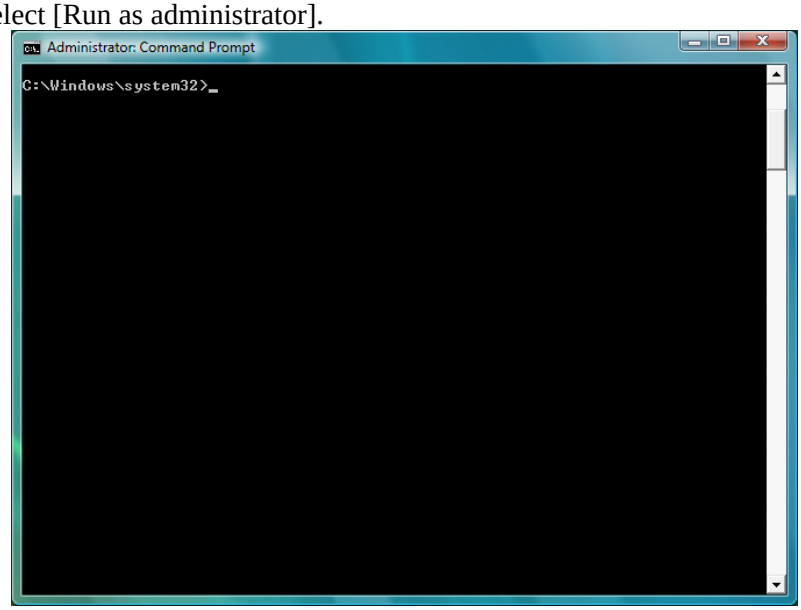


8. Click the [Create password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.

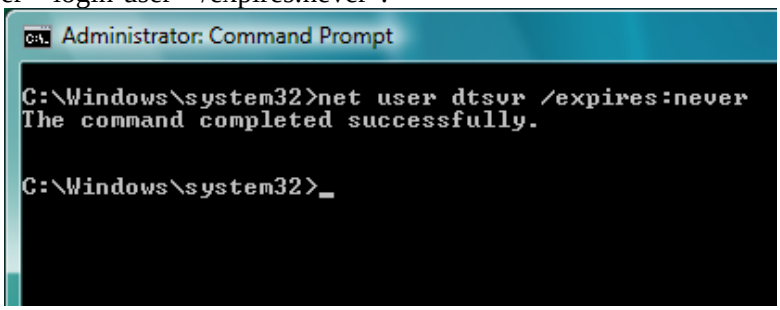
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password.
If you are necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

1. Select [Start] → [All Programs] → [Accessories] → [Command Prompt], right-click it to display a menu, then select [Run as administrator].



2. Input “net user login-user /expires:never”.



3. If the above message is displayed, the password expiration is stopped.

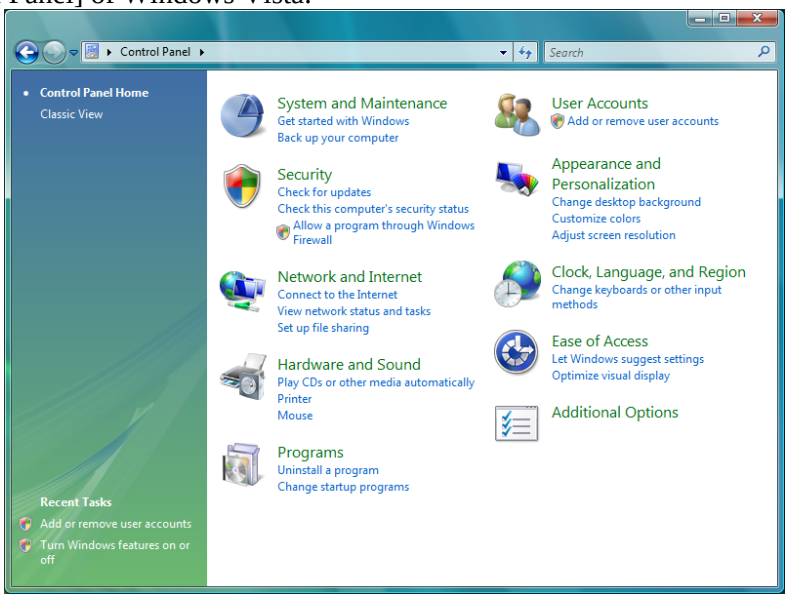
Confirming the Firewall function of Windows Vista

Because the Internet Connection Firewall function is included in the Windows Vista, the Data Server may not communicate with the FTP server.
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

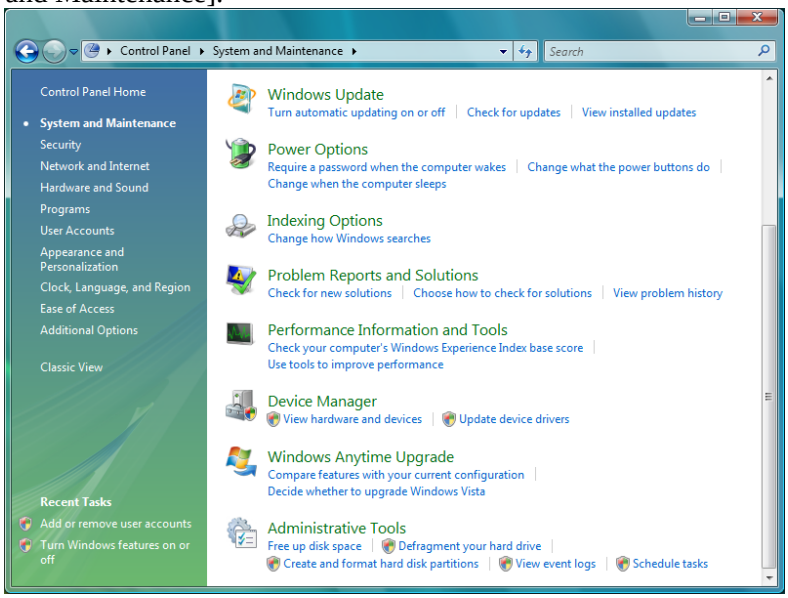
NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.
Therefore, when making the following settings, consult with your network administrator, and take special care.
In some cases, it becomes necessary to isolate the network from the outside as required.

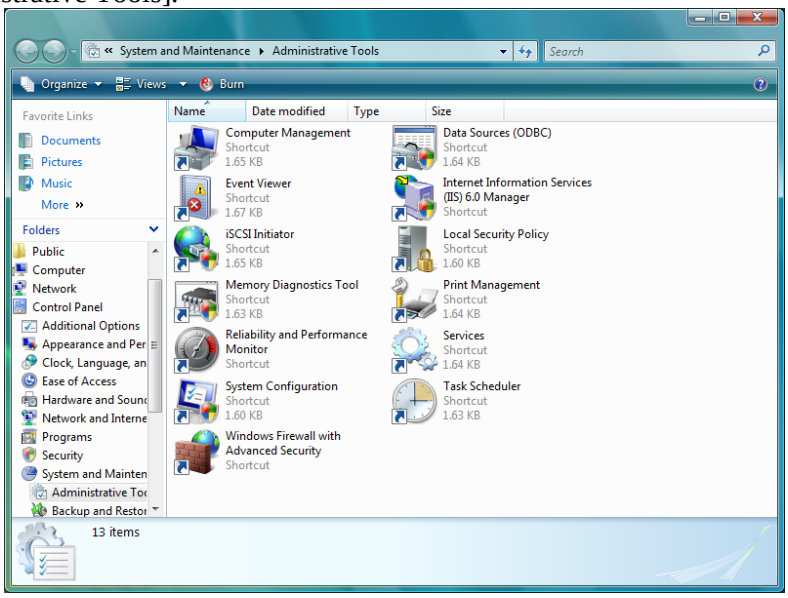
1. Open [Control Panel] of Windows Vista.



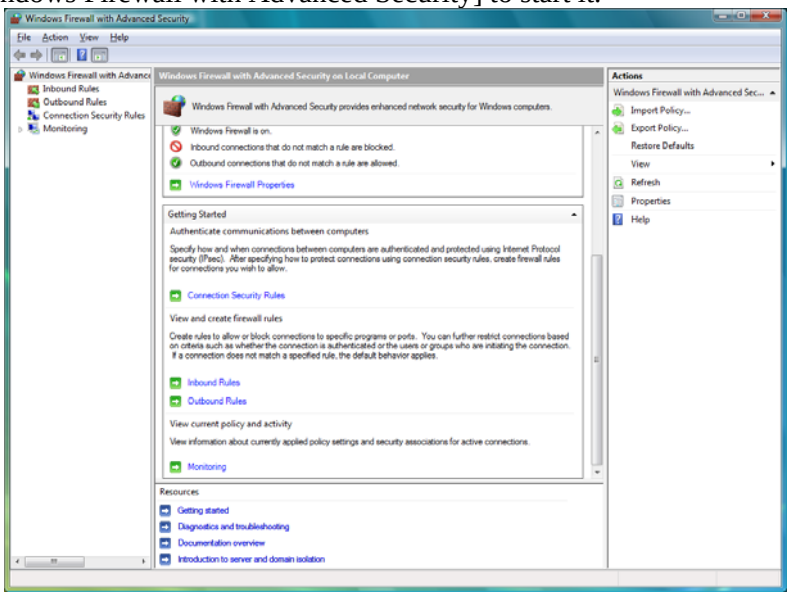
2. Click [System and Maintenance].



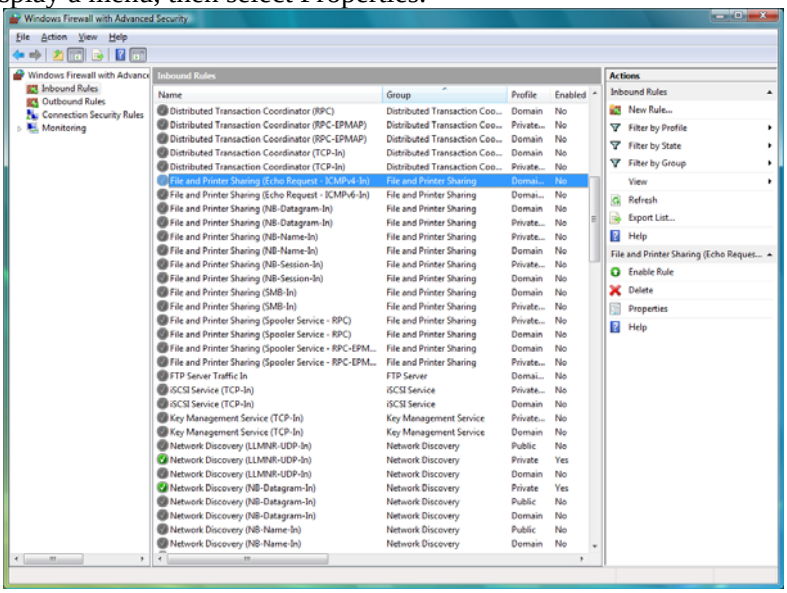
3. Click [Administrative Tools].



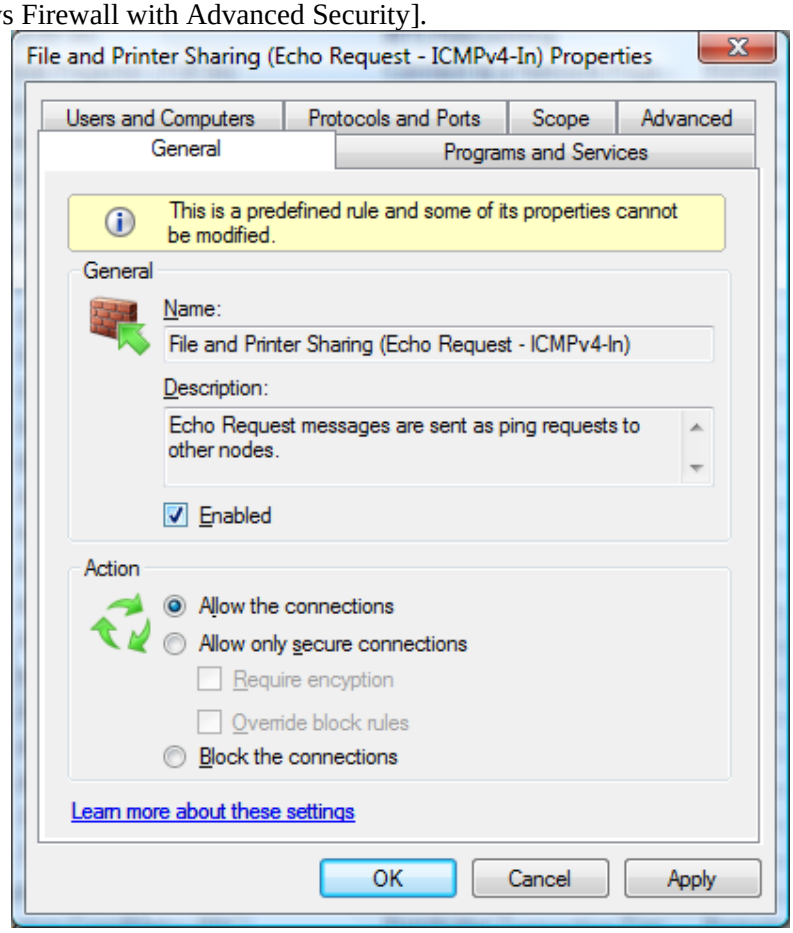
4. Double-click [Windows Firewall with Advanced Security] to start it.



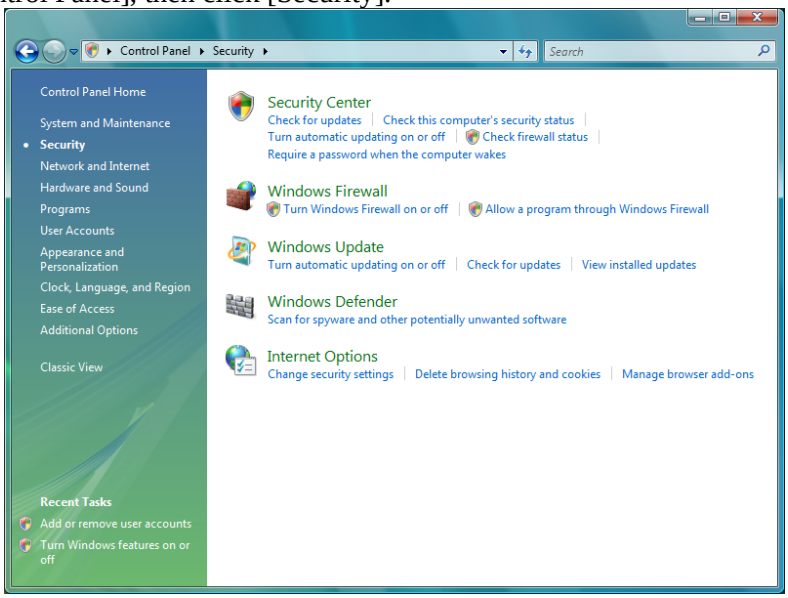
5. Click [Inbound Rules], select [File and Printer Sharing (Echo Request - ICMPv4 - In)] from the list, right-click it to display a menu, then select Properties.



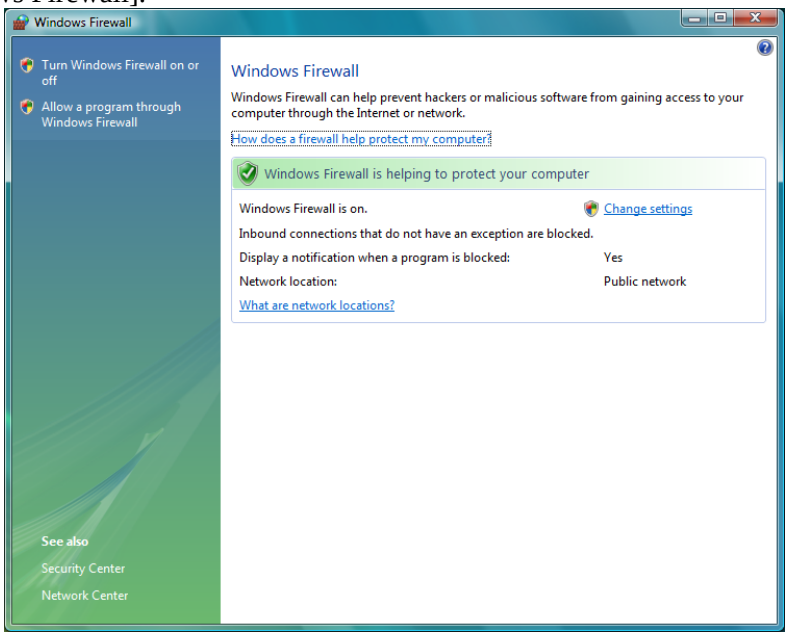
6. Display the [General] property sheet.
   Check [Enabled] in [General], then click the [OK] button.
   End [Windows Firewall with Advanced Security].



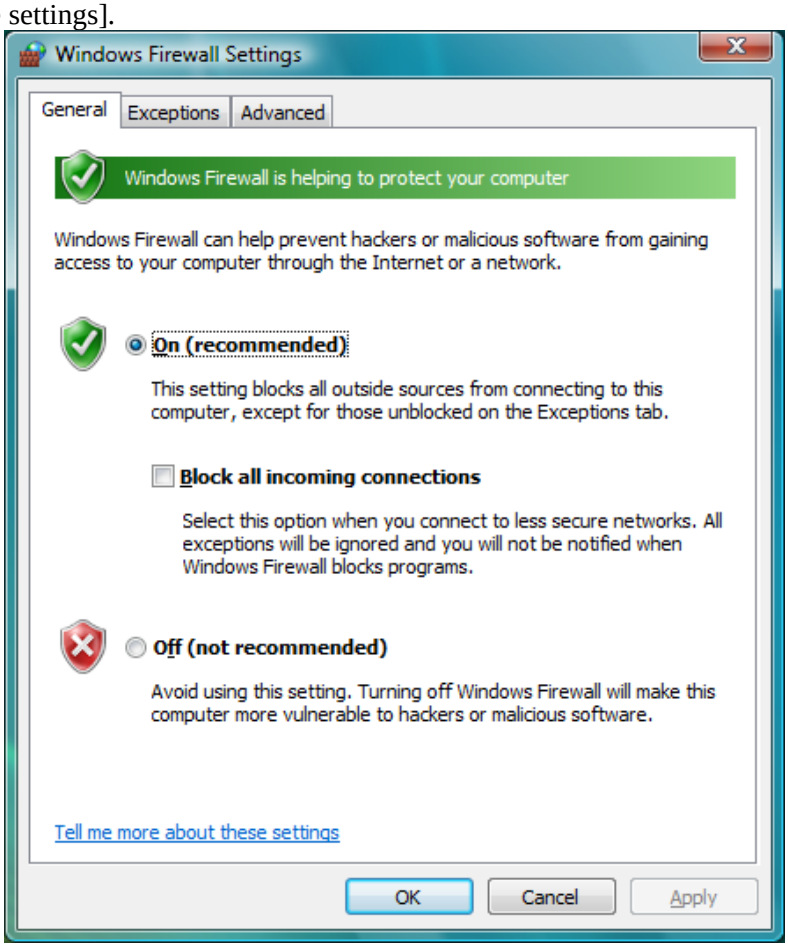
7. Return to [Control Panel], then click [Security].



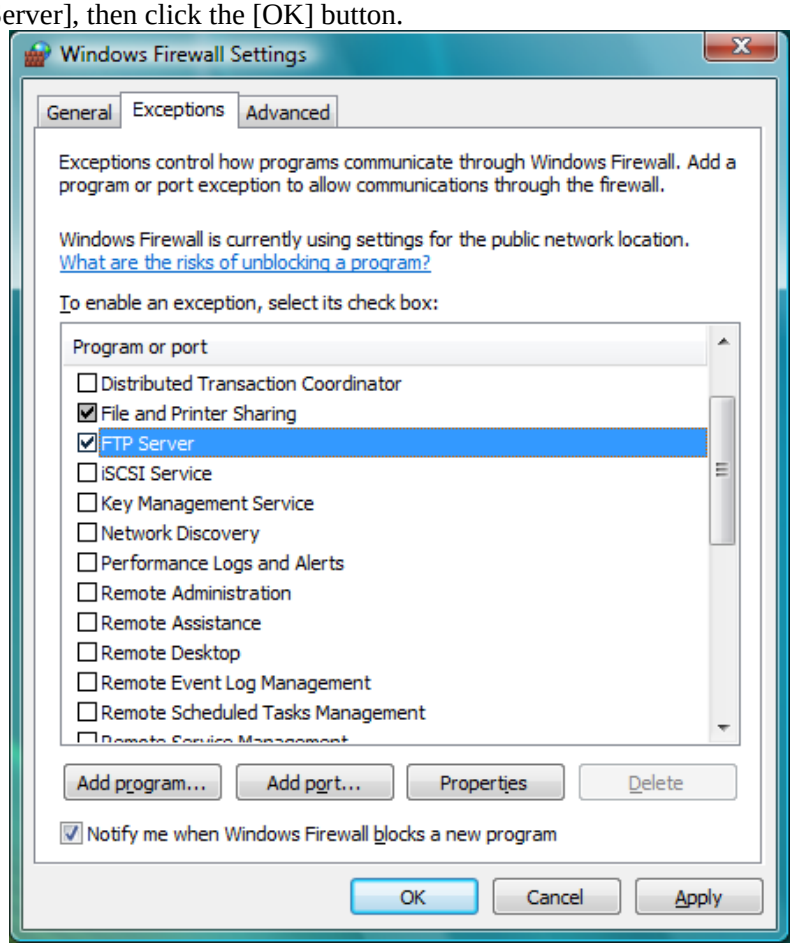
8. Click [Windows Firewall].



9. Click [Change settings].



10. Select the [Exceptions] tab.
    Check [FTP Server], then click the [OK] button.



B.4 SETTING UP FTP SERVER OF Windows 7 (FOR INTERNET INFORMATION SERVICE)

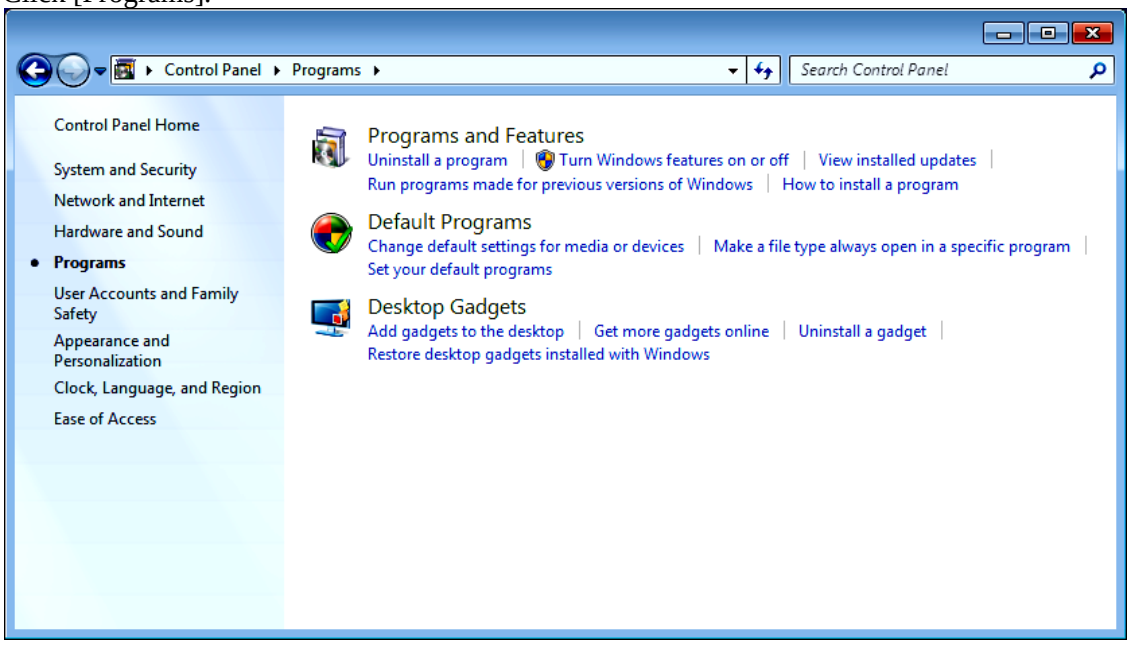
NOTE

The FTP Server features depend on the Edition of Windows 7.
Windows 7 Professional, Enterprise, and Ultimate have the FTP Server features.
The setting described above is just an example.

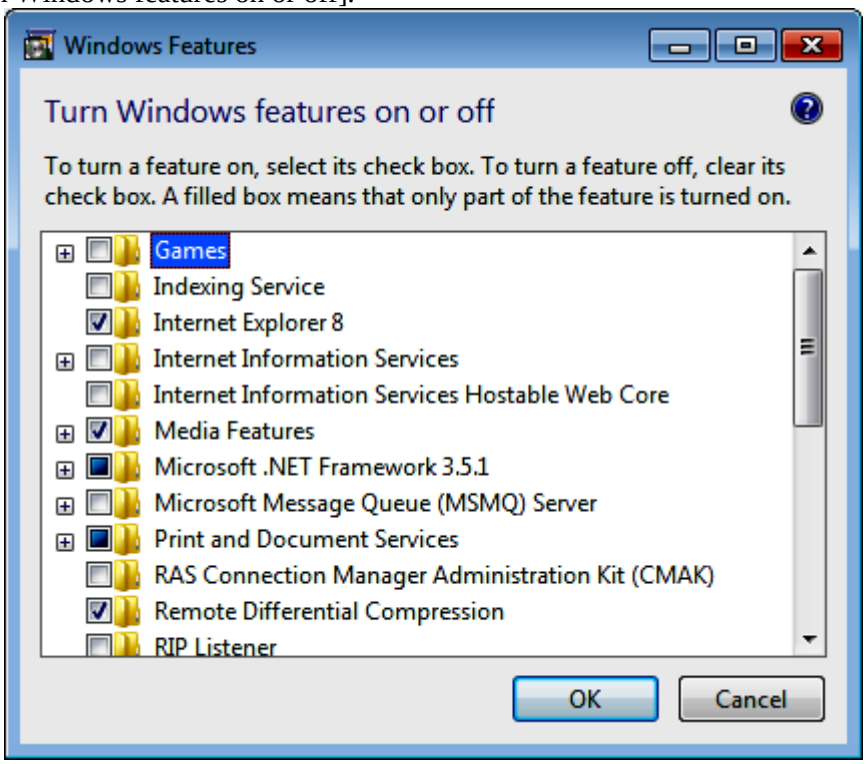
Installing the Internet Information Service

1. Open [Control Panel] of Windows 7.

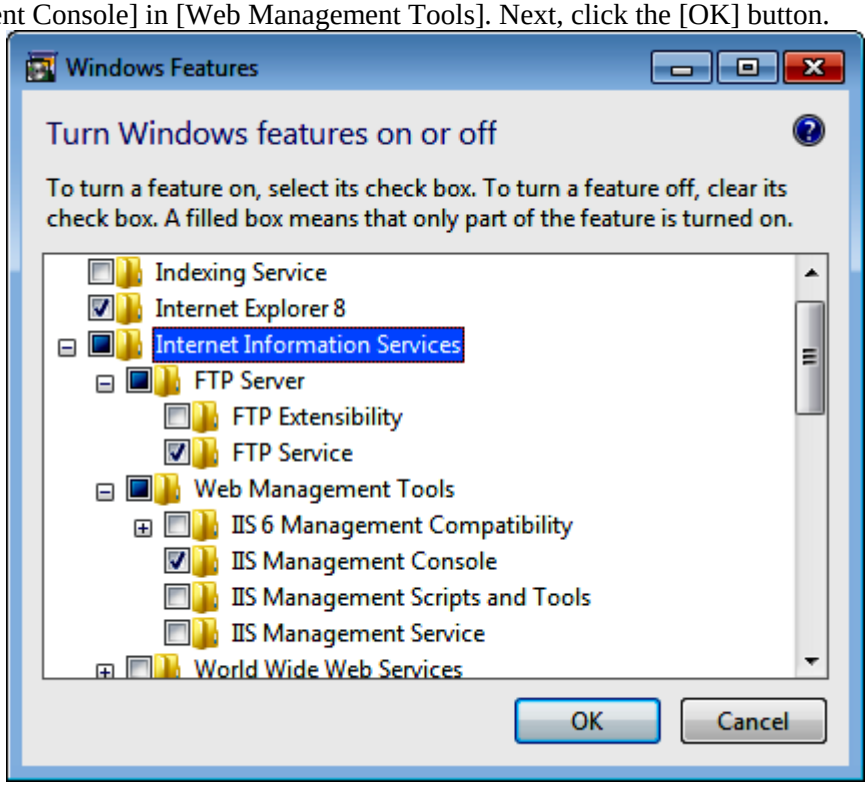
2. Click [Programs].



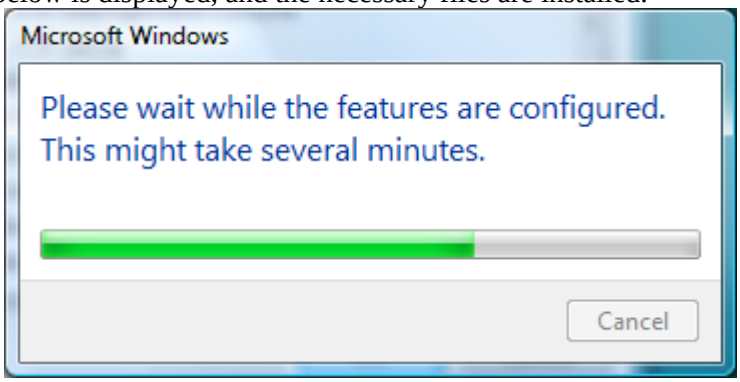
3. Click [Turn Windows features on or off].



4. Expand [Internet Information Services], then check [FTP Service] in [FTP Server] and [IIS Management Console] in [Web Management Tools]. Next, click the [OK] button.



5. The dialog box below is displayed, and the necessary files are installed.

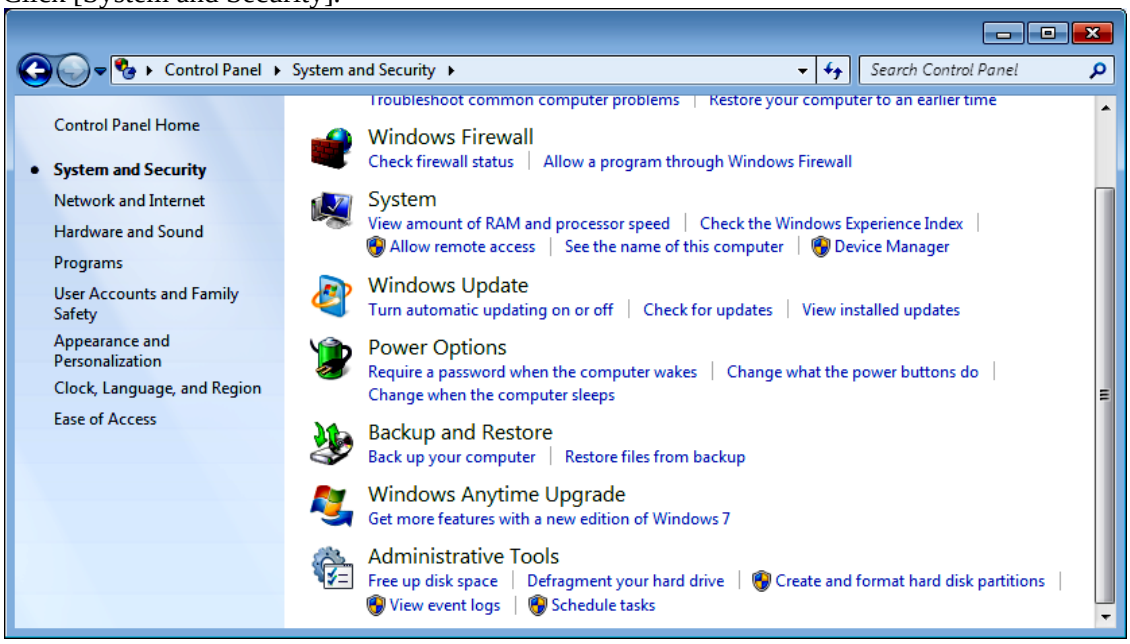


6. The installation is completed when the dialog box above and [Windows Features] dialog box are finished.

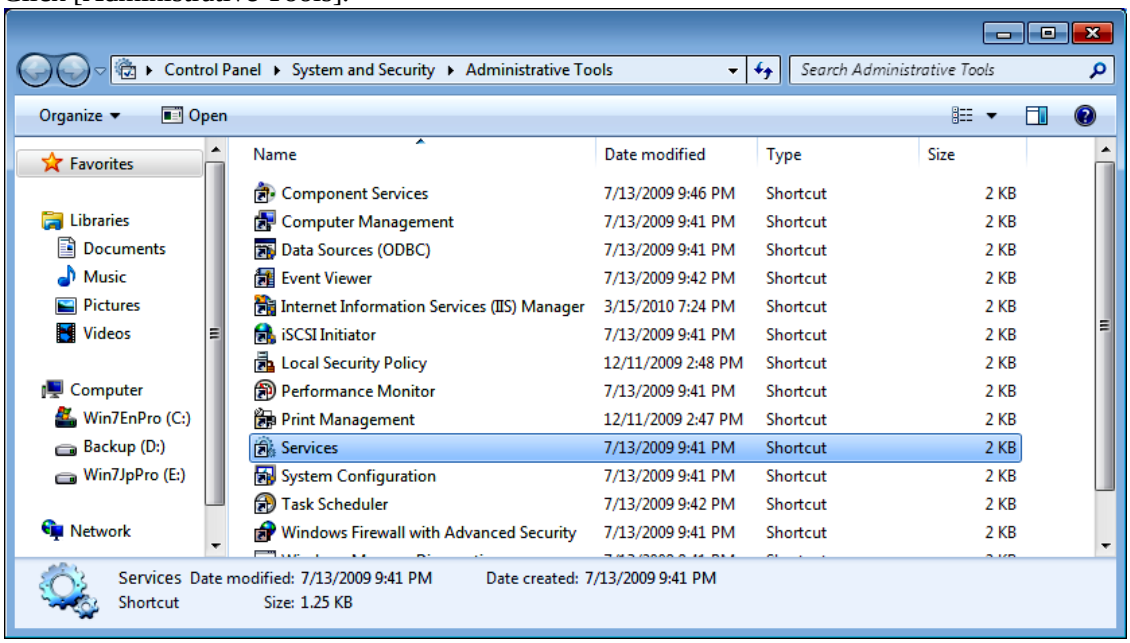
Setting the Internet Information Service

1. Open [Control Panel] of Windows 7.

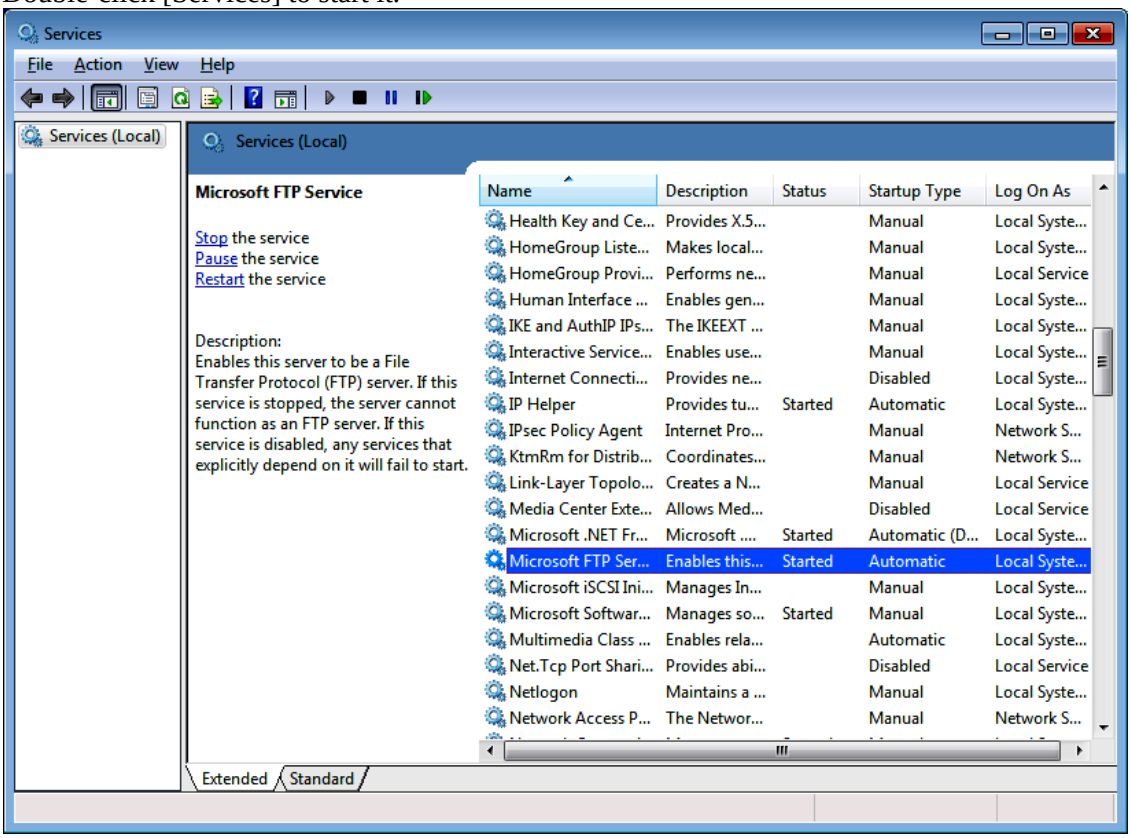
2. Click [System and Security].



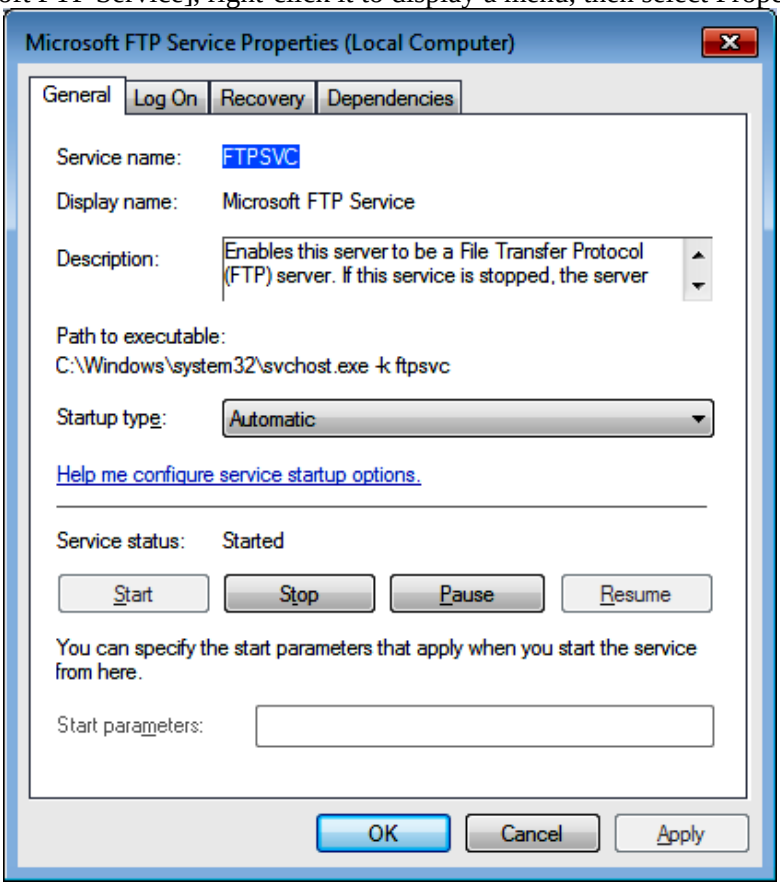
3. Click [Administrative Tools].



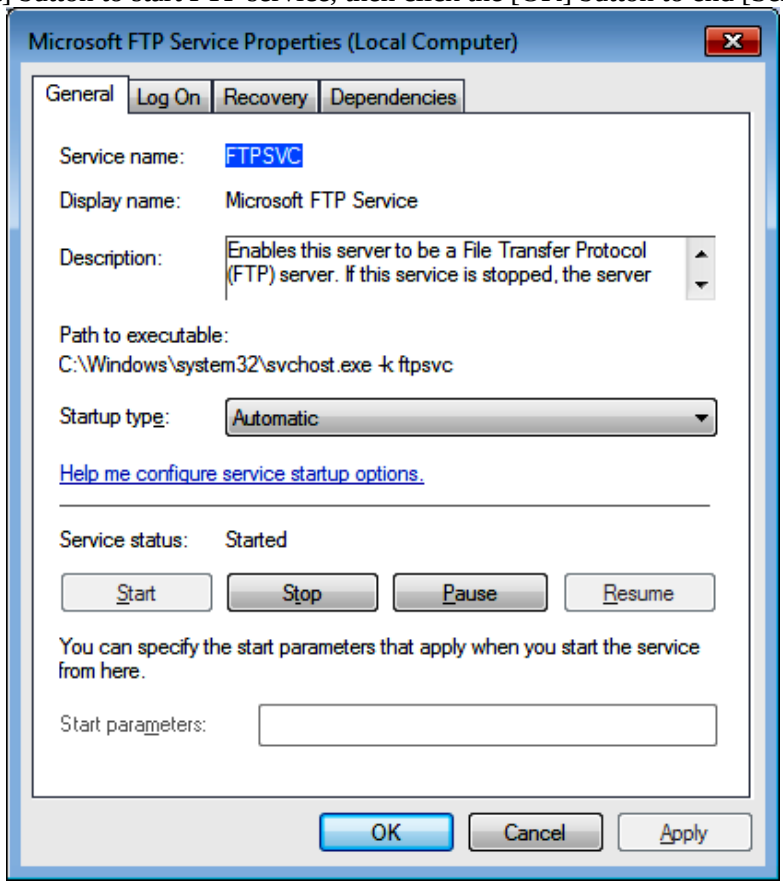
4. Double-click [Services] to start it.



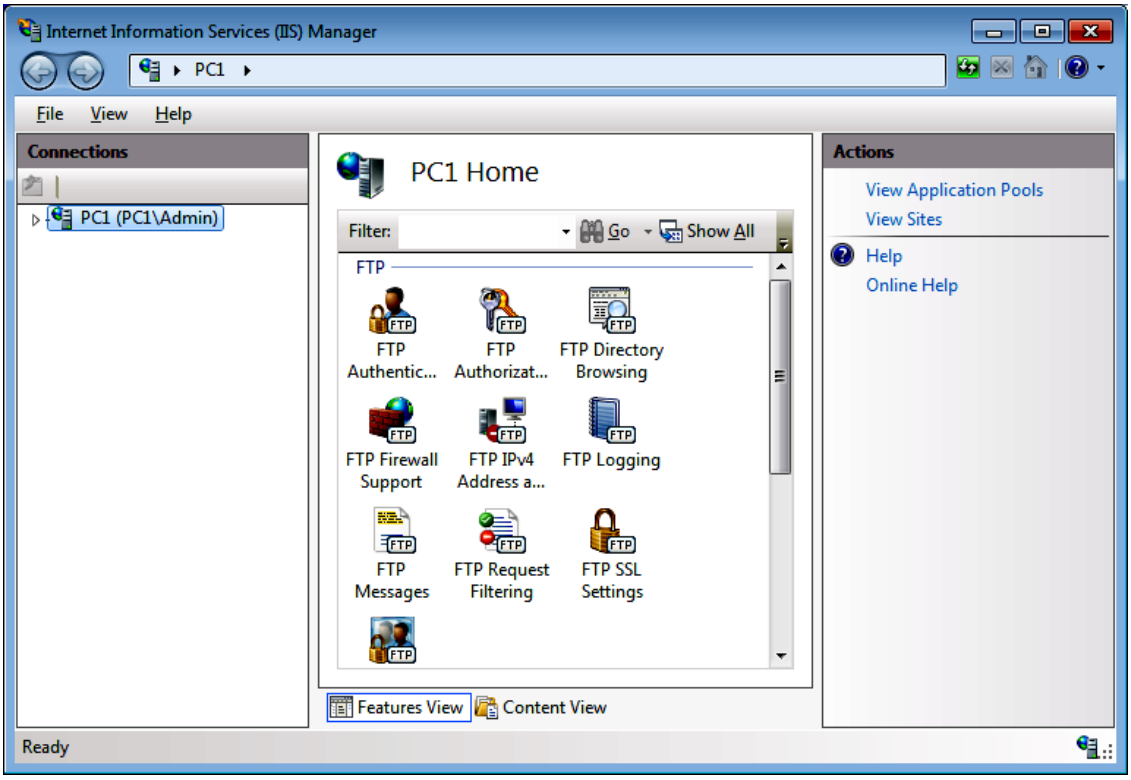
5. Select [Microsoft FTP Service], right-click it to display a menu, then select Properties.



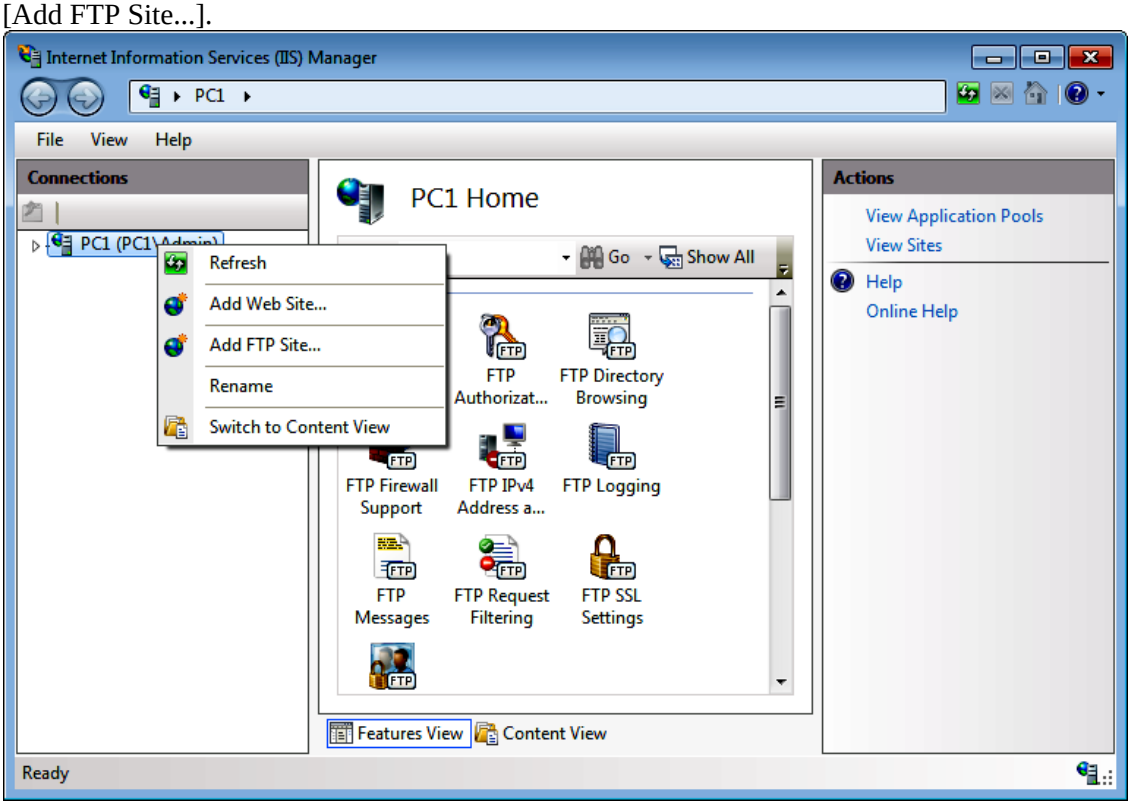
6. Display the [General] property sheet.
Choose [Automatic] from [Startup type] drop-down list. Next, if [Service status] is not [Started], click the [Start] button to start FTP service, then click the [OK] button to end [Services].



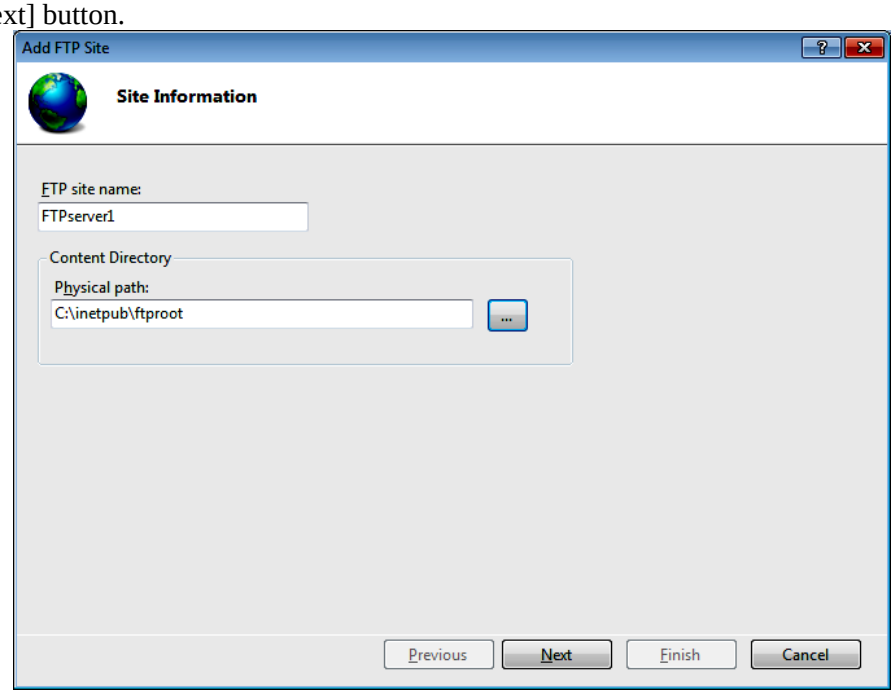
7. Return to [Administrative Tools], then double-click [Internet Information Services (IIS) Manager] to start it.



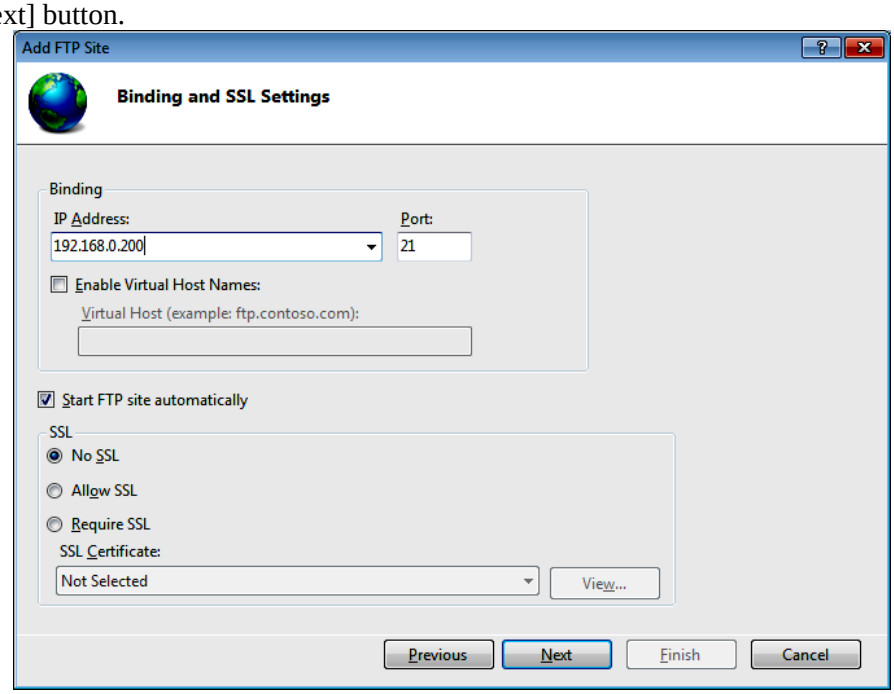
8. Right-click Computer name(“PC1” in the following figure) to display a left side menu, then select [Add FTP Site...].



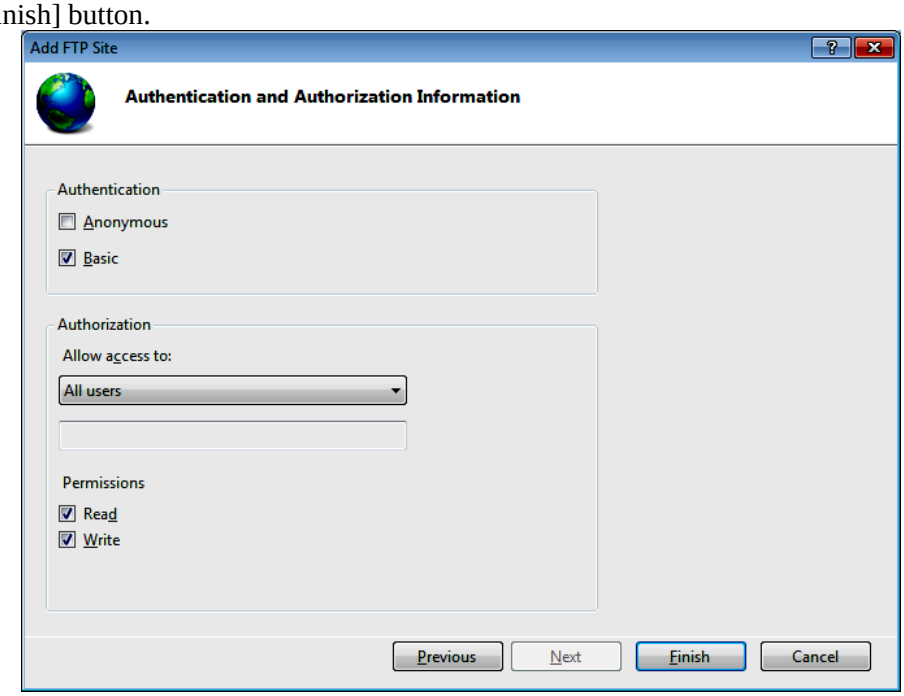
9. In the displayed [Site Information] dialog box below, set the name of an FTP site to be created in [FTP site name:] and the path to the FTP server home directory in [Physical path:] in [Content Directory]. The FTP clients can access only the directories under the home directory set in this step. Click [Next] button.



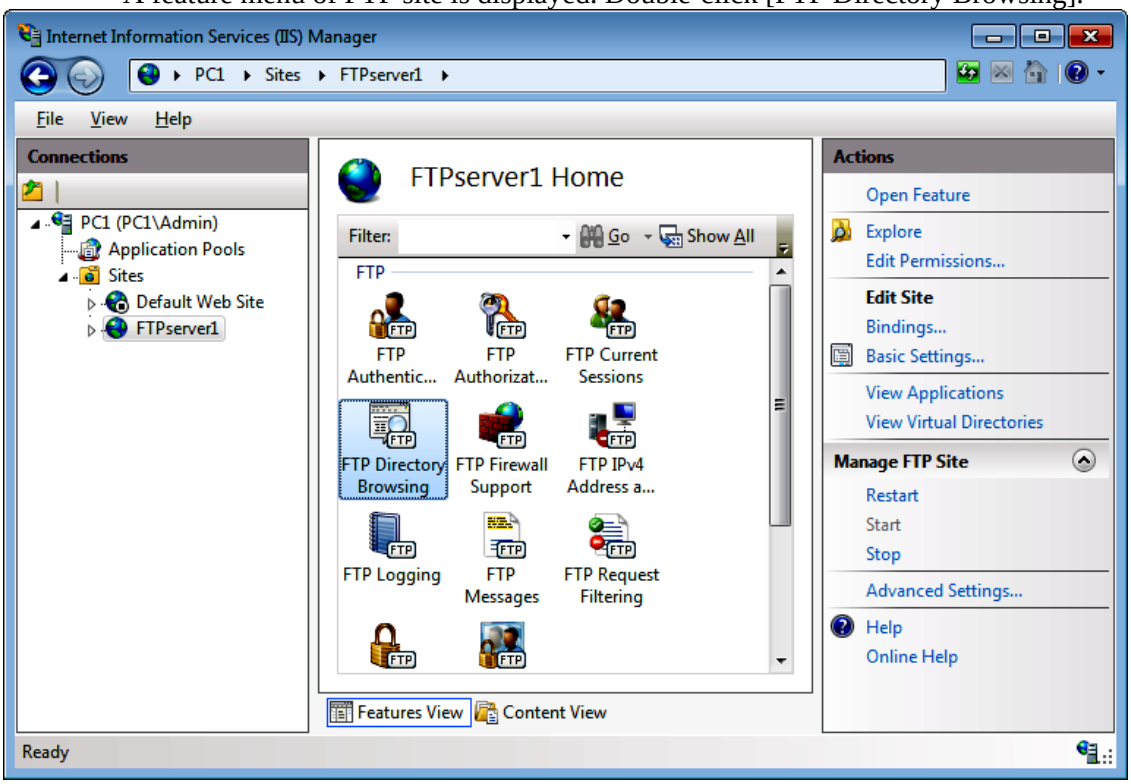
10. The [Binding and SSL setting] dialog box below is displayed.
    Input the IP address and port number (usually 21) in [IP Address] and [Port].
    Check [Start FTP site automatically] and select [No SSL] in [SSL].
    Click [Next] button.



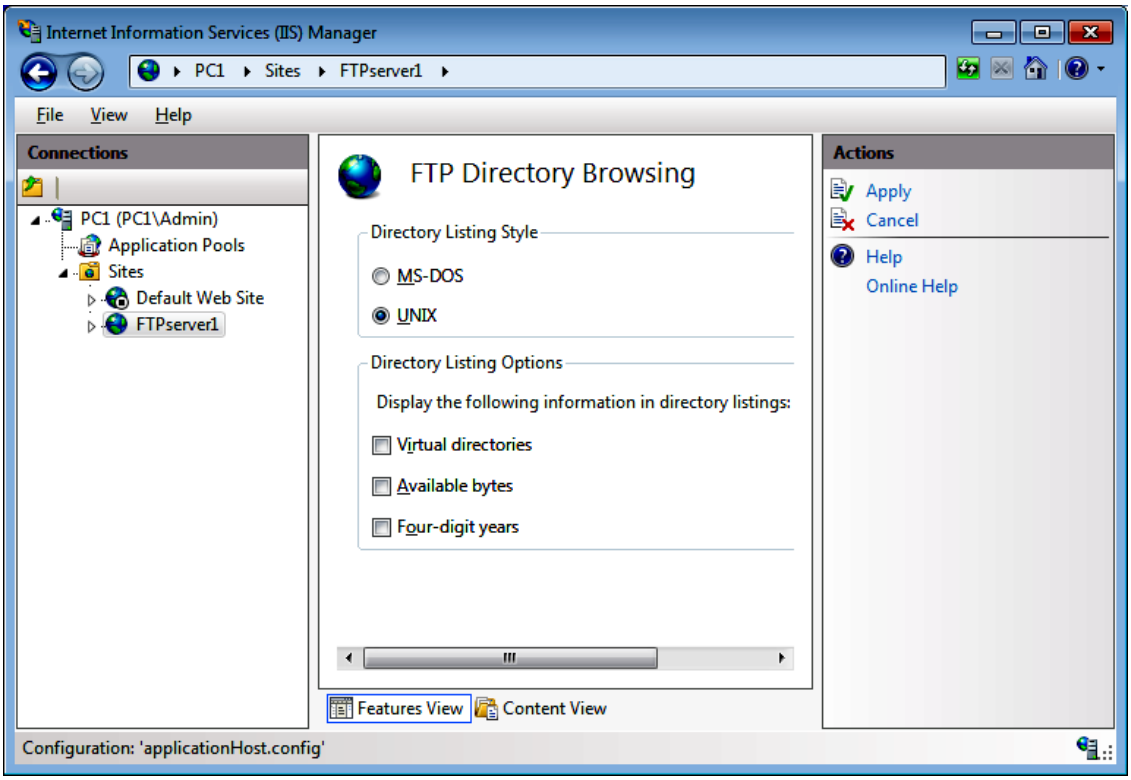
11. The [Authentication and Authorization Information] dialog box below is displayed.
    Check [Basic] in [Authentication], choose [All users] from [Allow access to:] drop-down list in [Authorization], and check [Read] and [Write] in [Permissions].
    Click [Finish] button.



12. Expand tree in left pane and select FTP site name set in step 9.
A feature menu of FTP site is displayed. Double-click [FTP Directory Browsing].



13. In [Directory Listing Style], [MS-DOS] is selected by default.
However, it is recommended to select [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.



14. To access a directory other than the directories under the home directory set in step 9 above, a virtual directory needs to be set.
    For details of a virtual directory, use information such as the online help information of Windows 7.

Login User Setting

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

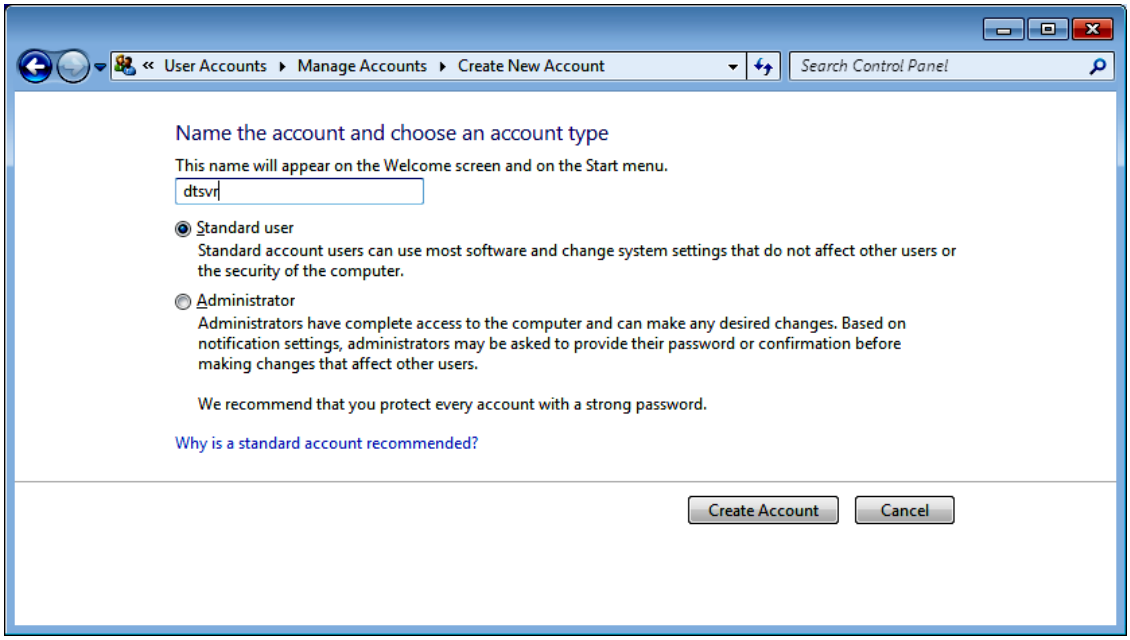
1. Open [Control Panel] of Windows 7.

2. Click [Add or remove user accounts].

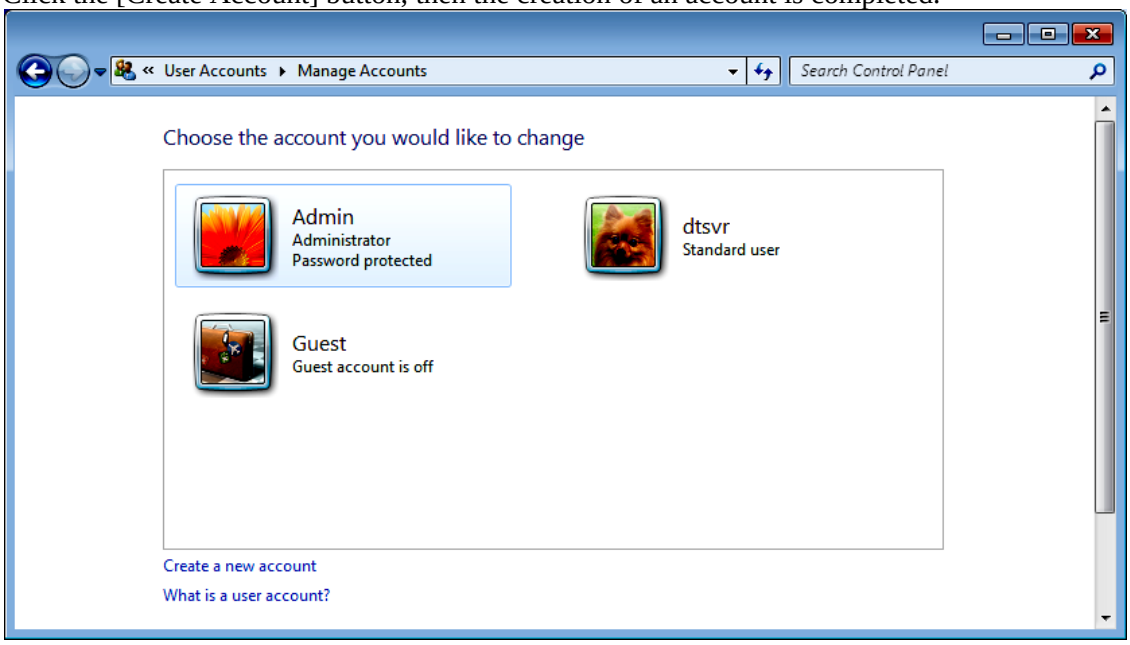
3. Click [Create a new account], then enter a desired user name and set an account type.
   The access right can affect the right to read from and write to a file in FTP-based communication. Use care when setting an access right.

NOTE

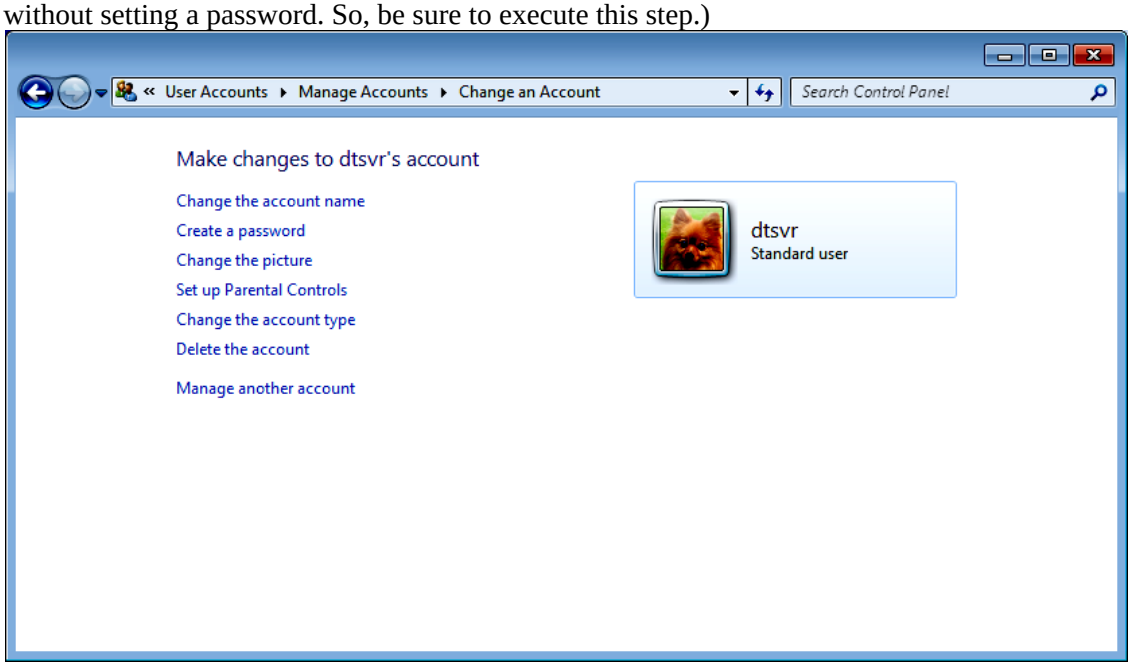
When Administrator is not selected as the account type, files may not be able to be read or written by the account. In this case, grant an access right to read and write the home directory set in step 9 in "Setting the Internet Information Service" described above to the user account.



4. Click the [Create Account] button, then the creation of an account is completed.



5. For password setting, click the previously created account. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)



6. Click [Create a password], then enter a password for the specified user name.

8. Click the [Create password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.

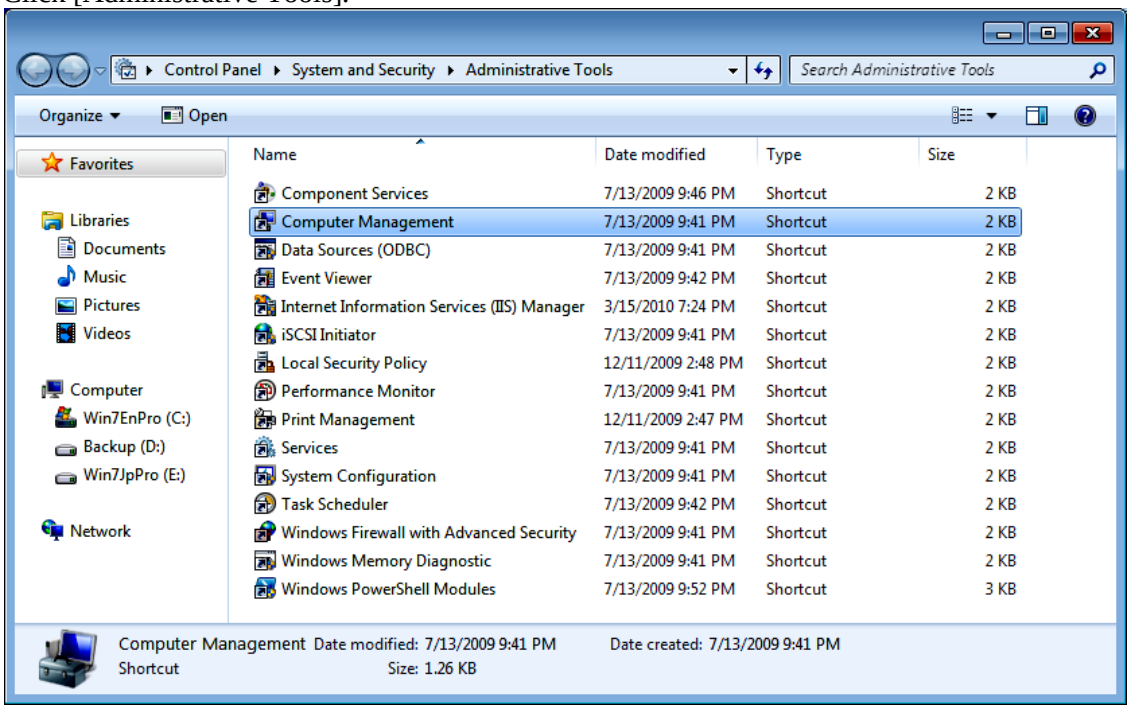
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password. If necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

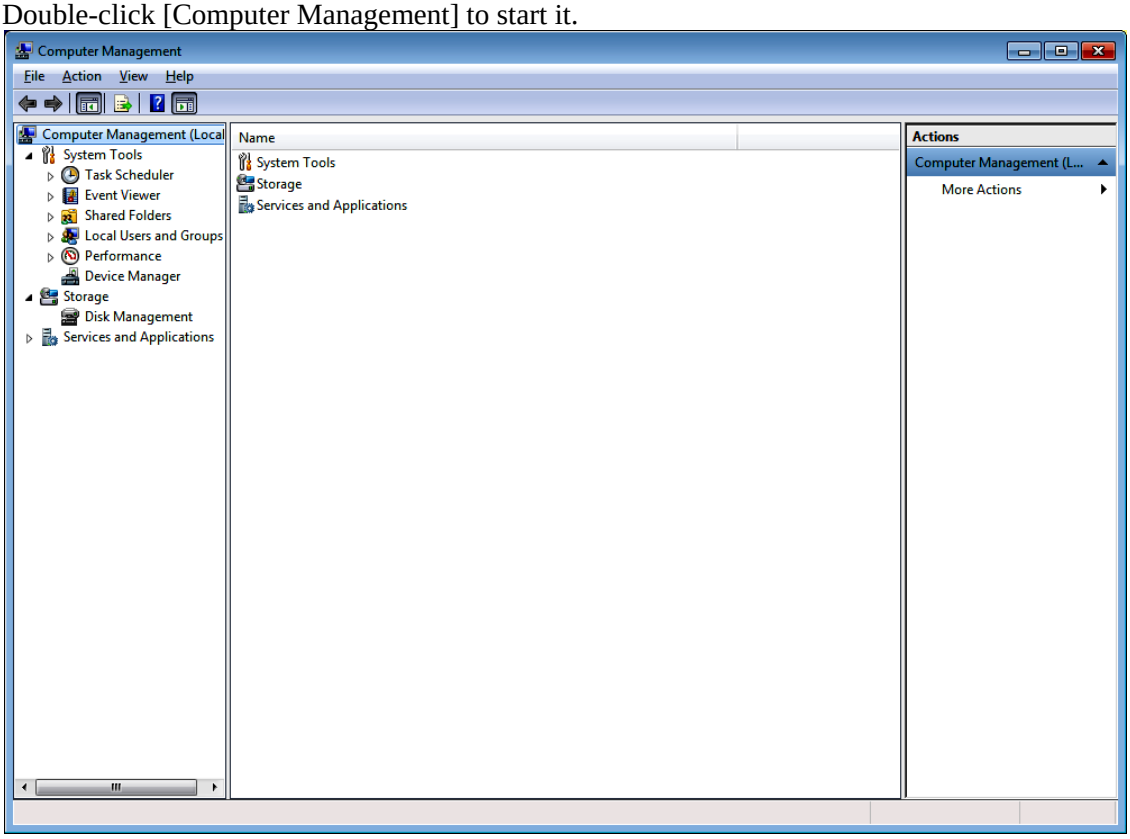
1. Open [Control Panel] of Windows 7.

2. Click [System and Security].

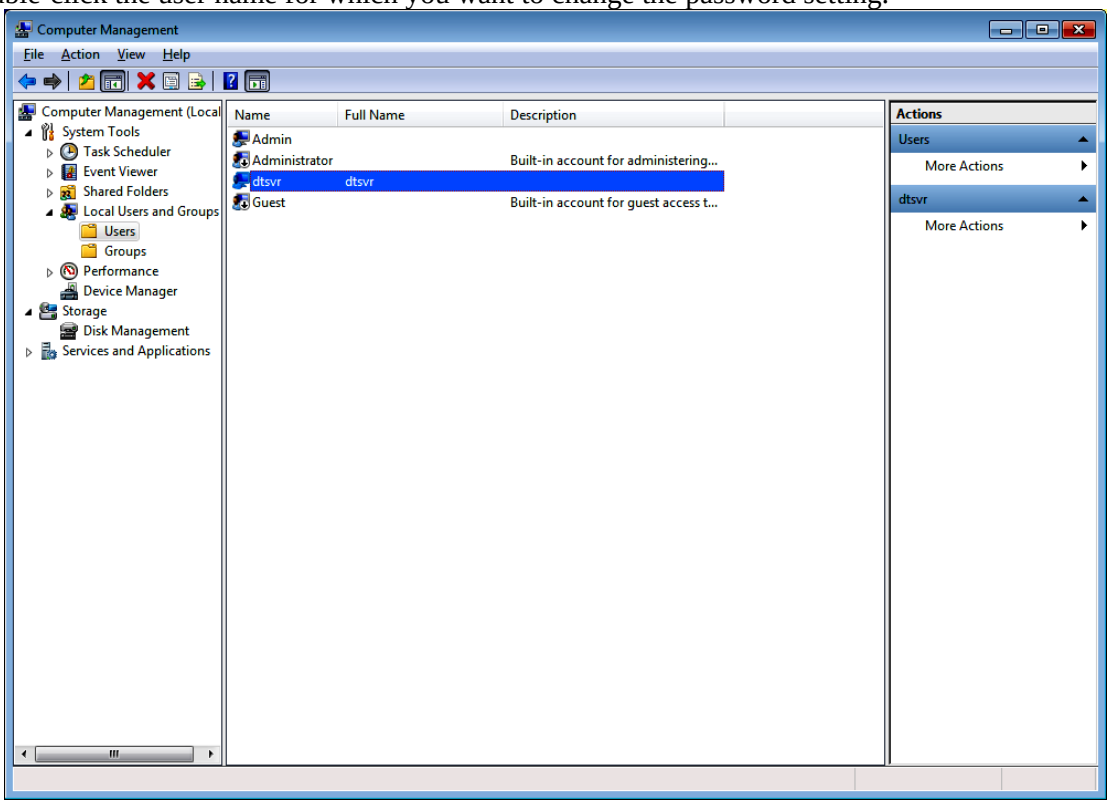
3. Click [Administrative Tools].



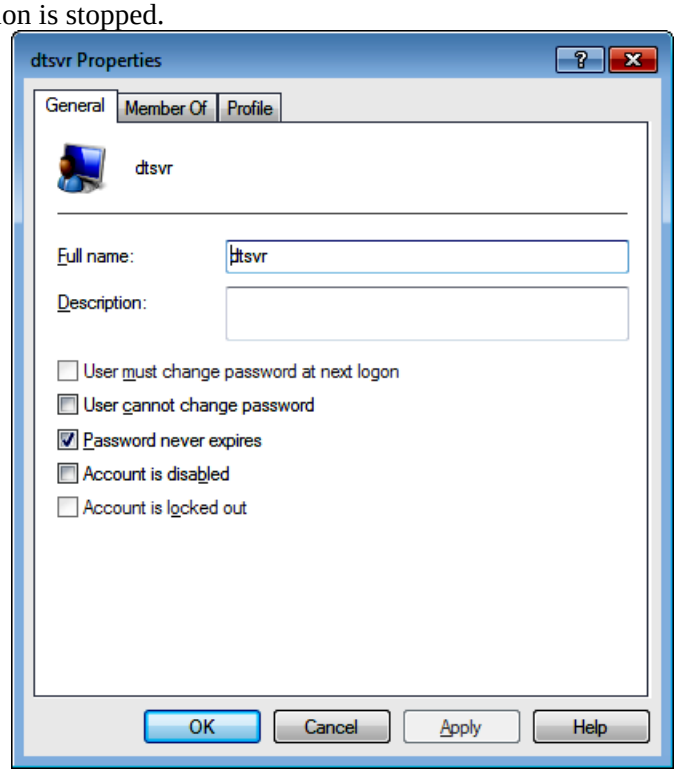
4. Double-click [Computer Management] to start it.



5. Expand [Local Users and Groups] in left pane, then click [Users]. A list of registered users is displayed.
   Double-click the user name for which you want to change the password setting.



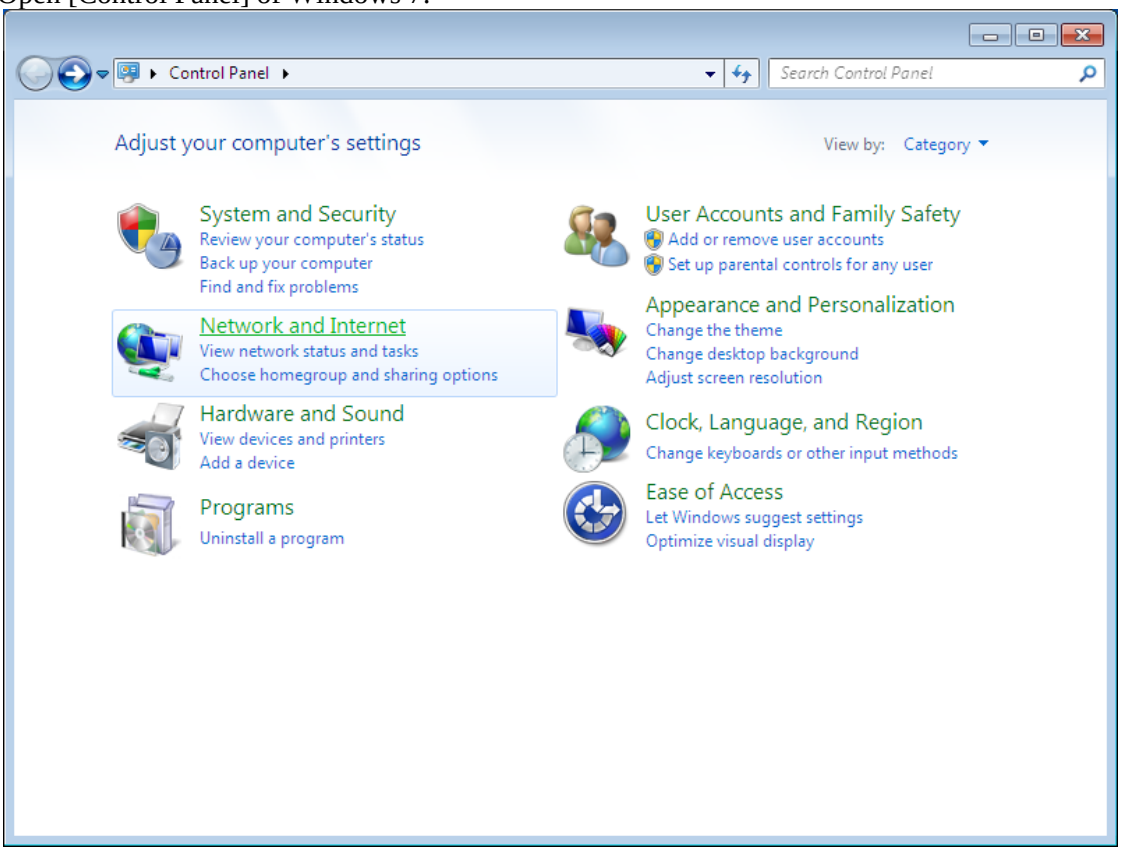
6. Check [Password never expires] and then click [OK] button.
   The password expiration is stopped.



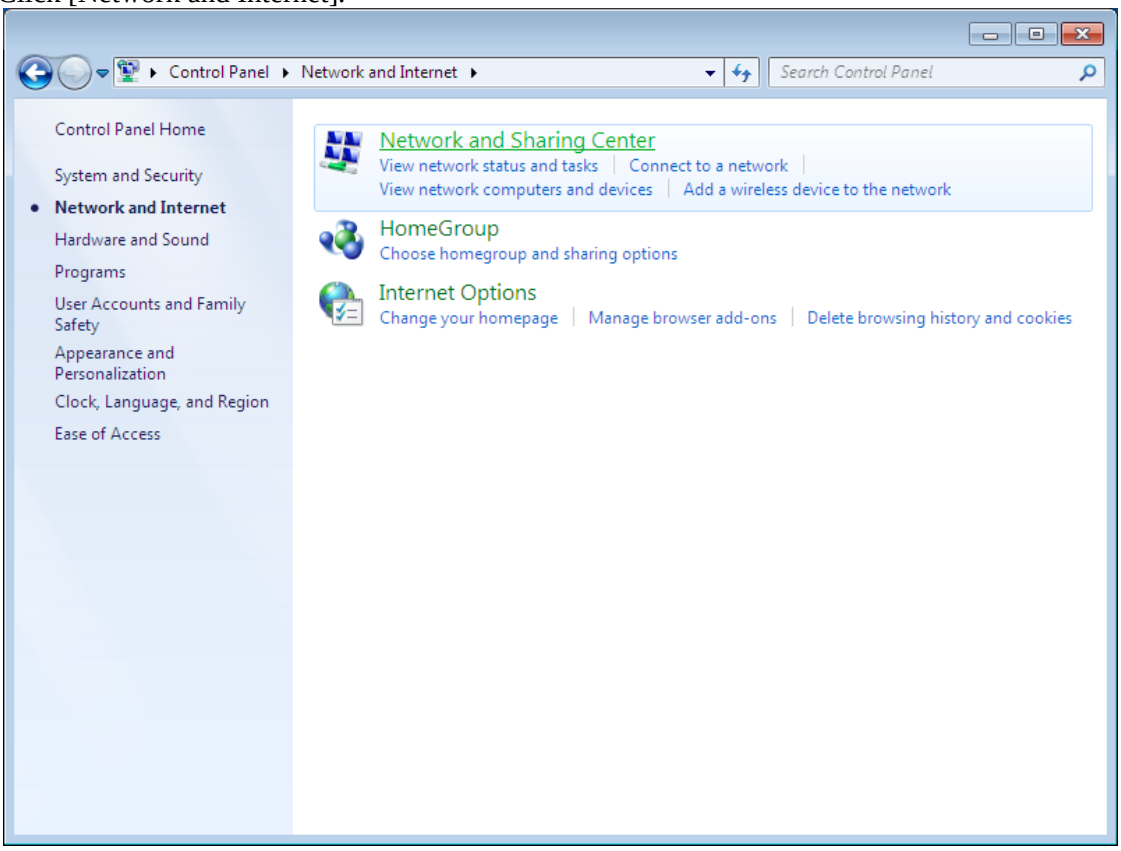
Checking the Windows 7 network

Windows 8 manages networks by network connection location. In addition, it is necessary to set the Windows 7 standard firewall function, which will be described later, by network location type. Before setting the firewall, check the type of network location you use as described below.

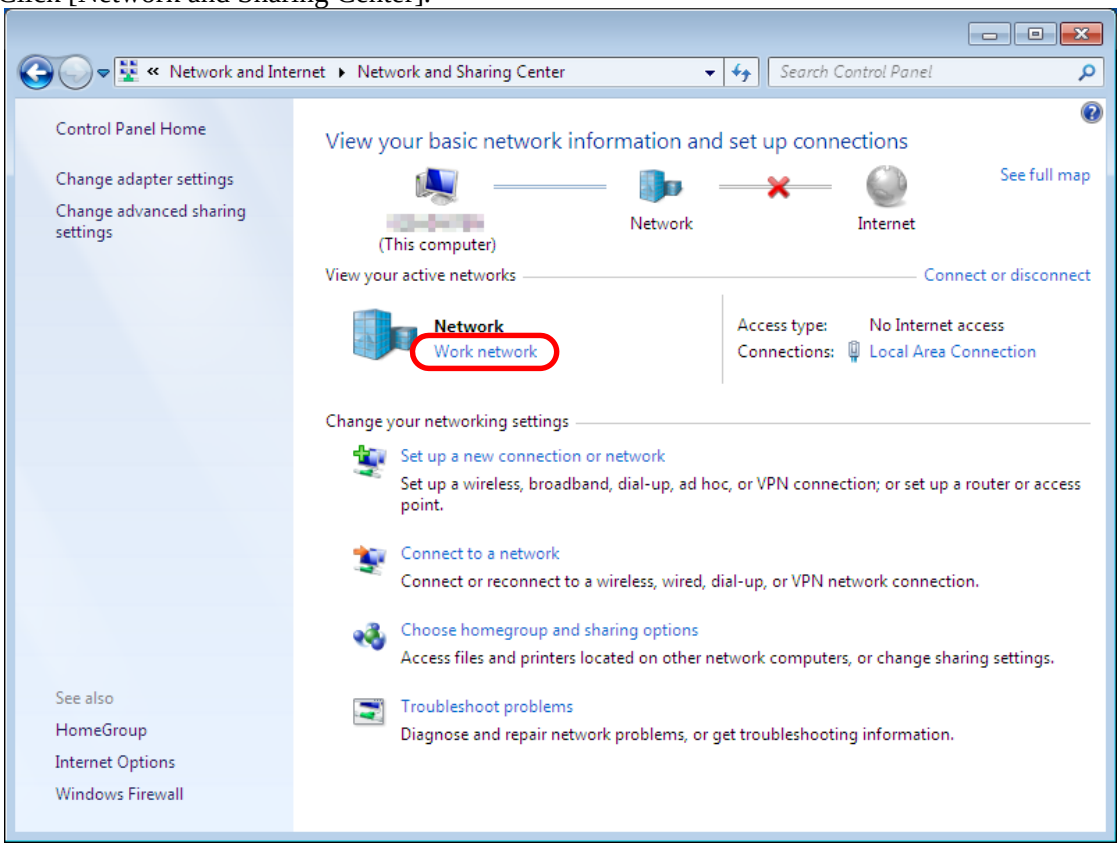
1 Open [Control Panel] of Windows 7.



2 Click [Network and Internet].



3 Click [Network and Sharing Center].



4 The string (in a red circle) displayed under [View your active networks] indicates the network location type. There are two typical types of network locations: Private network (Work network and Home network) and public network.

Confirming the Firewall function of Windows 7

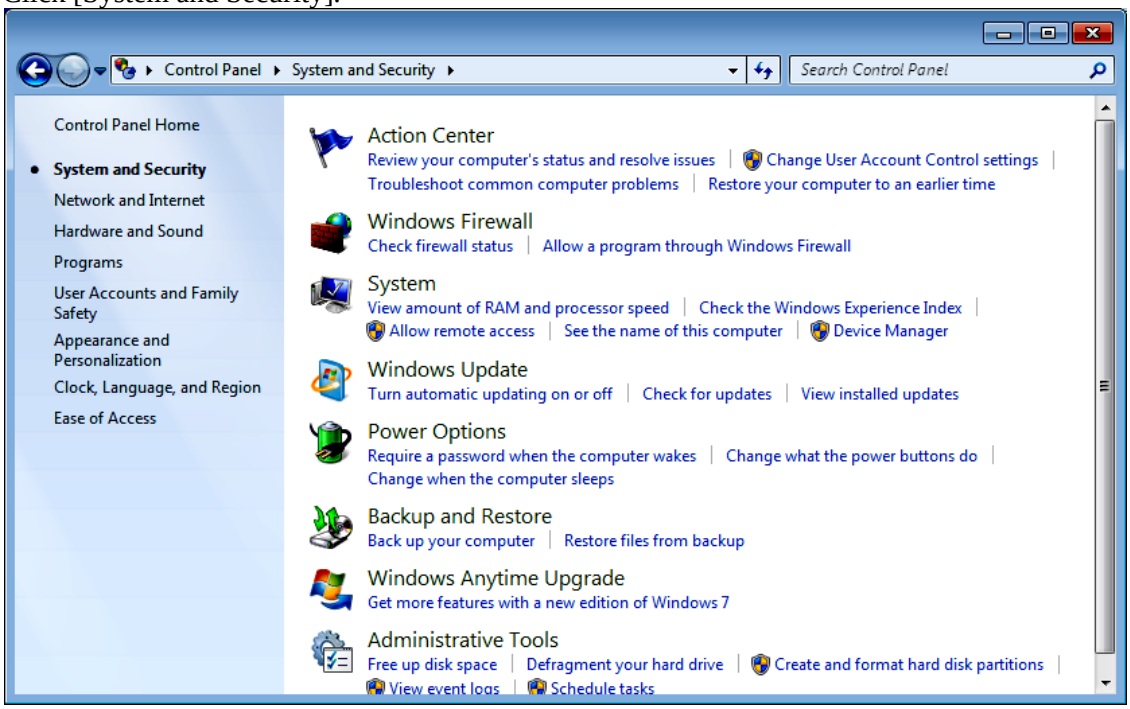
Because the Internet Connection Firewall function is included in the Windows 7, the Data Server may not communicate with the FTP server.
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

NOTE

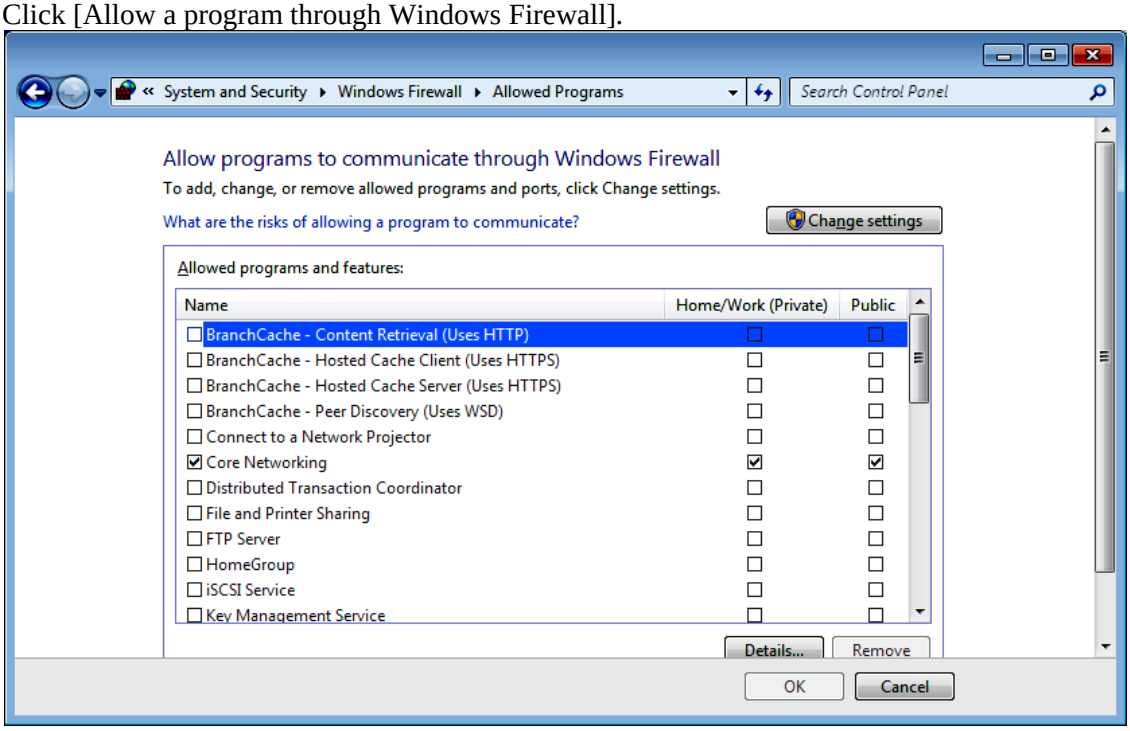
When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.
Therefore, when making the following settings, consult with your network administrator, and take special care.
In some cases, it becomes necessary to isolate the network from the outside as required.

1. Open [Control Panel] of Windows 7.

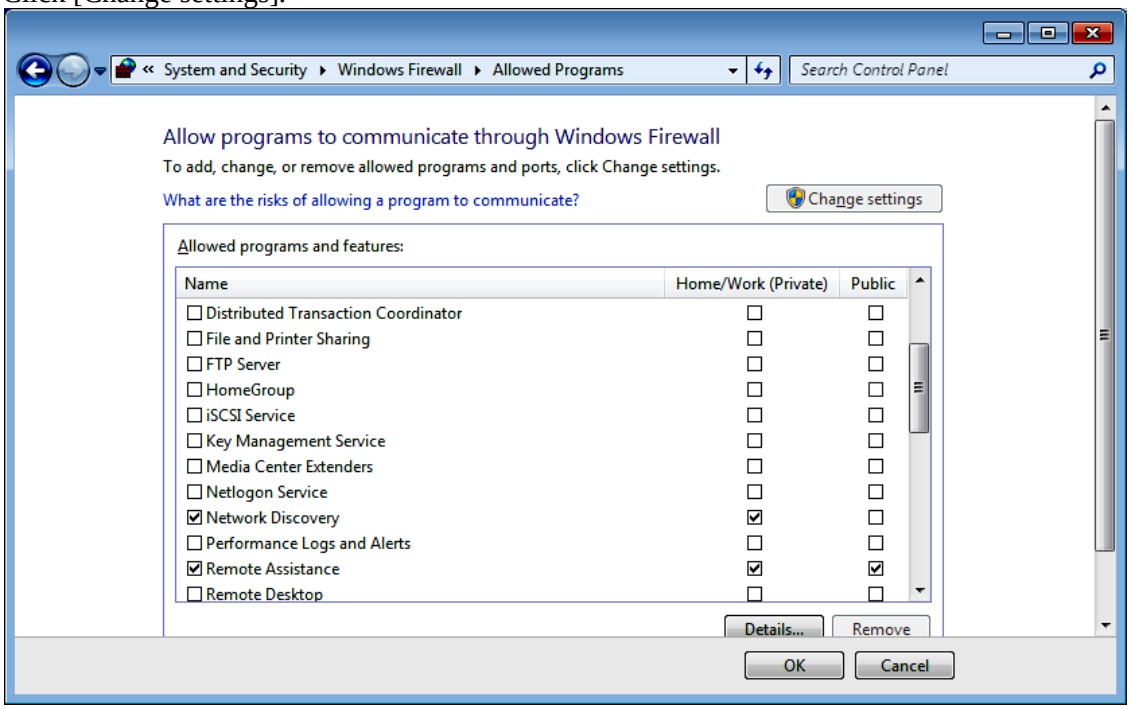
2. Click [System and Security].



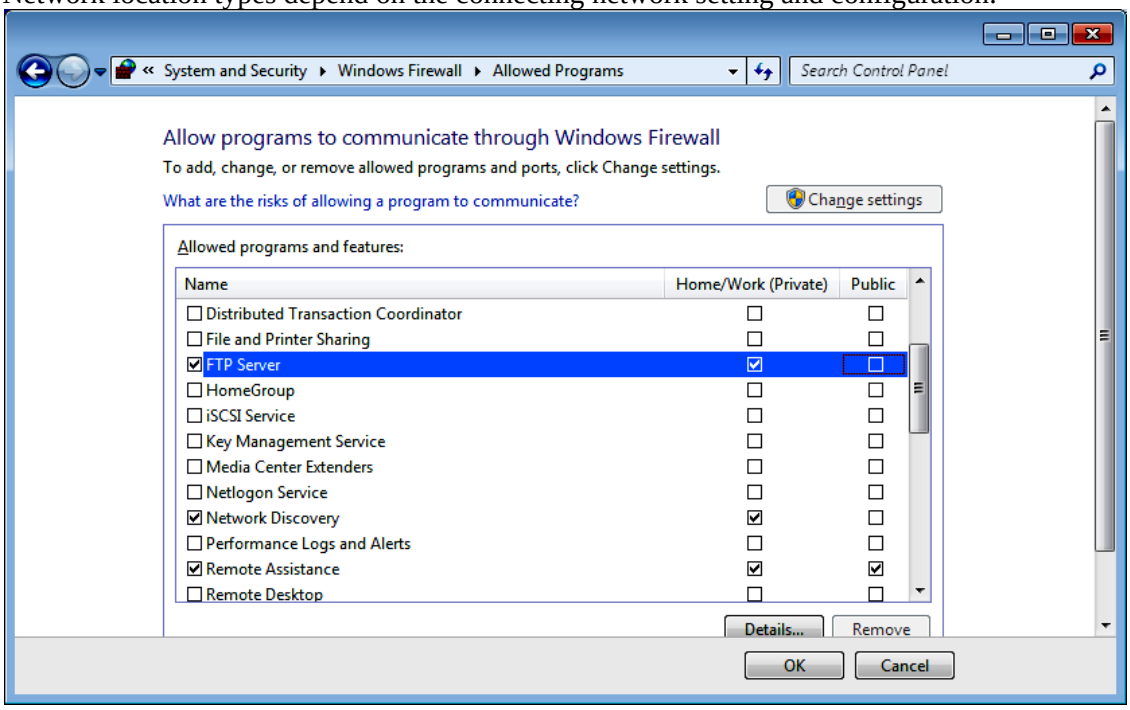
3. Click [Allow a program through Windows Firewall].



4. Click [Change settings].



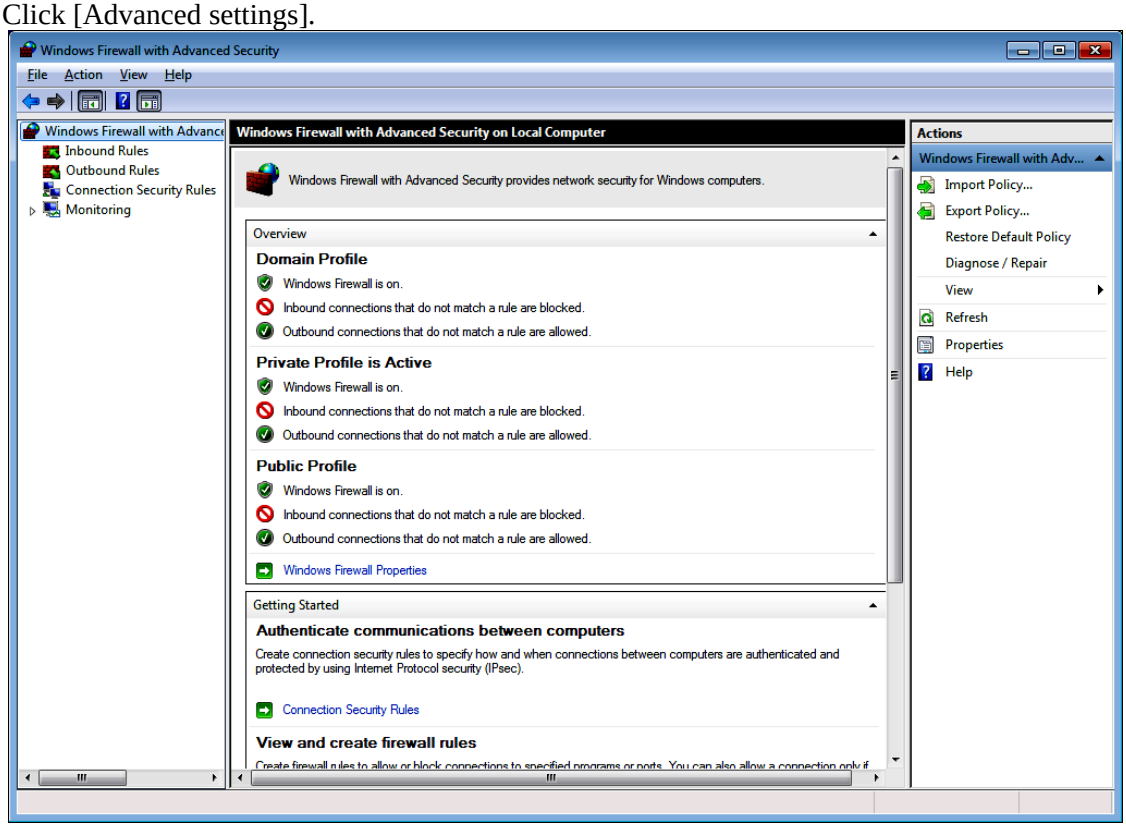
5. Check [FTP Server] and network location types.
Network location types depend on the connecting network setting and configuration.



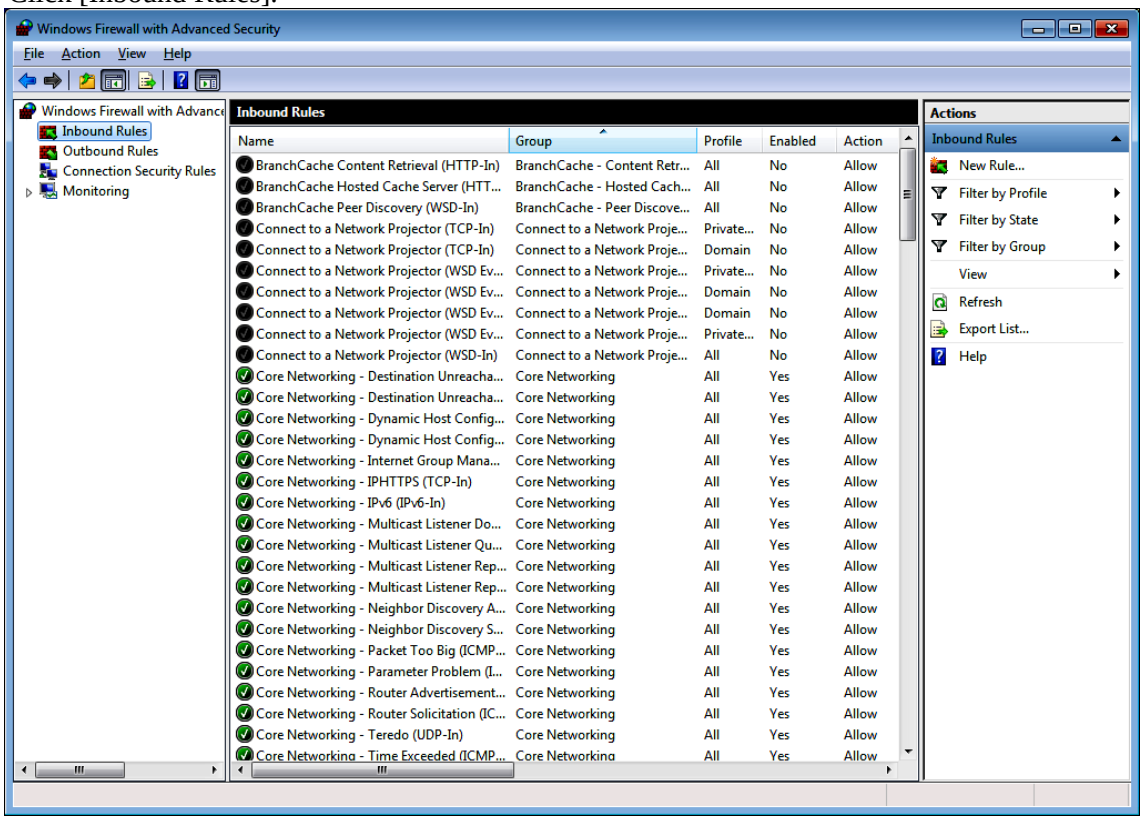
6. Click [OK] button to close this window.

7. Return to [System and Security], then click [Windows Firewall].

8. Click [Advanced settings].



9. Click [Inbound Rules].



10. Check if [FTP Server (FTP Traffic-In)], [FTP Server Passive (FTP Passive Traffic-In)], and [File and Printer Sharing (Echo Request - ICMPv4-In)] are enabled. If those rules are not enable, select them and click [Enable Rule] in right pane. There are same name rule in [Inbound Rules], but their targets are different network location. The choice of rule to change enabled depend on rule's [Profile] and network location types.

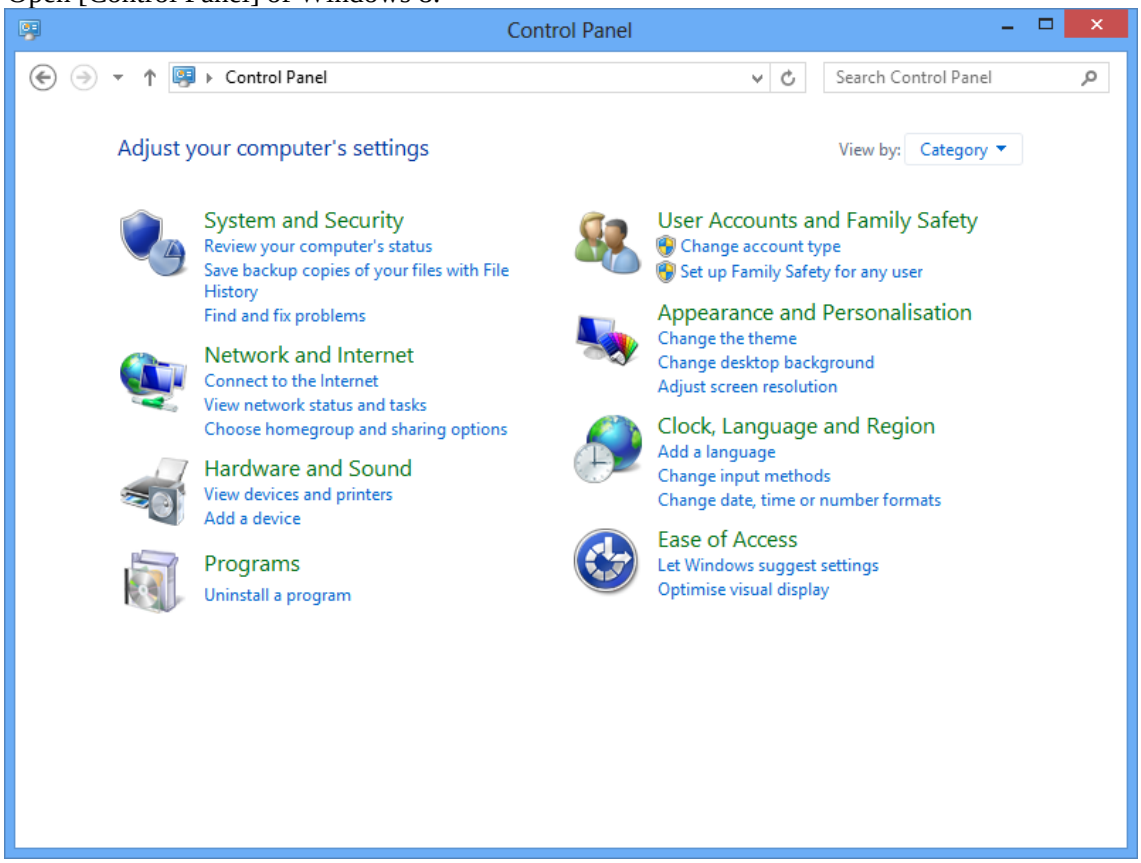
B.5 SETTING UP FTP SERVER OF Windows 8 Pro (FOR INTERNET INFORMATION SERVICE)

NOTE

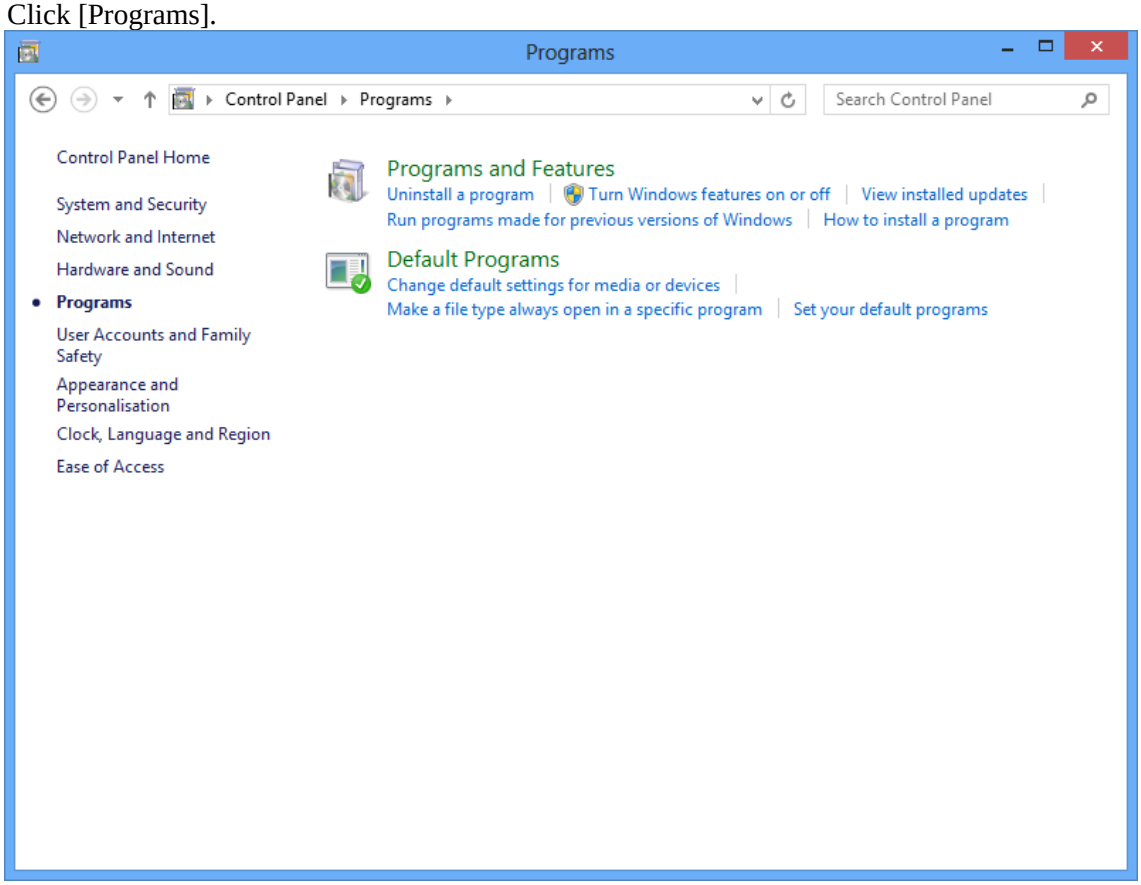
When Windows8 is used, Windows8 Pro is recommended by occasion of the specification of user account management.

Installing the Internet Information Service

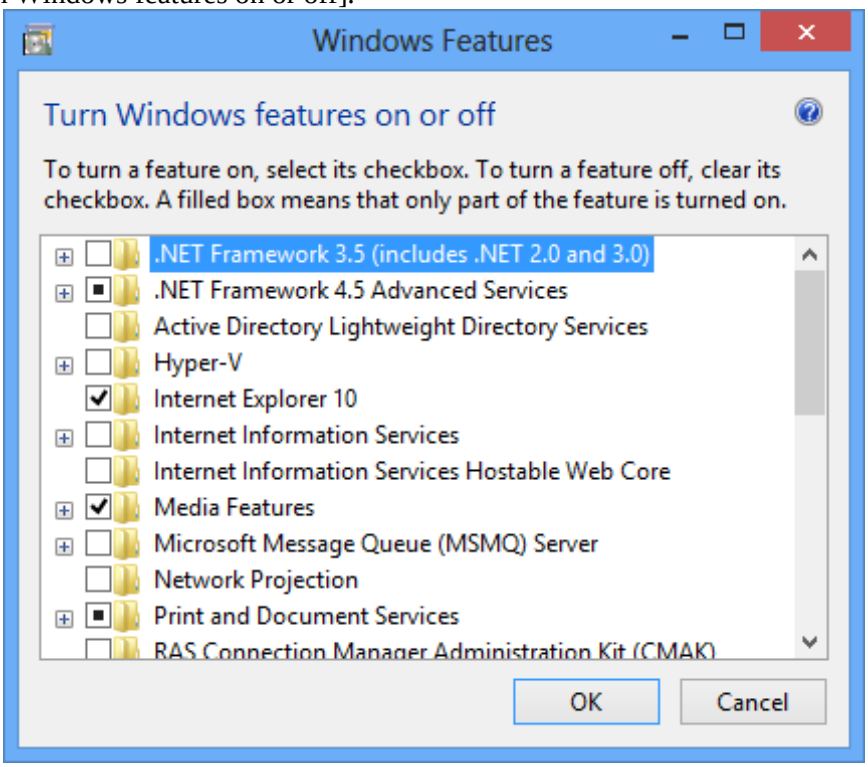
1 Open [Control Panel] of Windows 8.



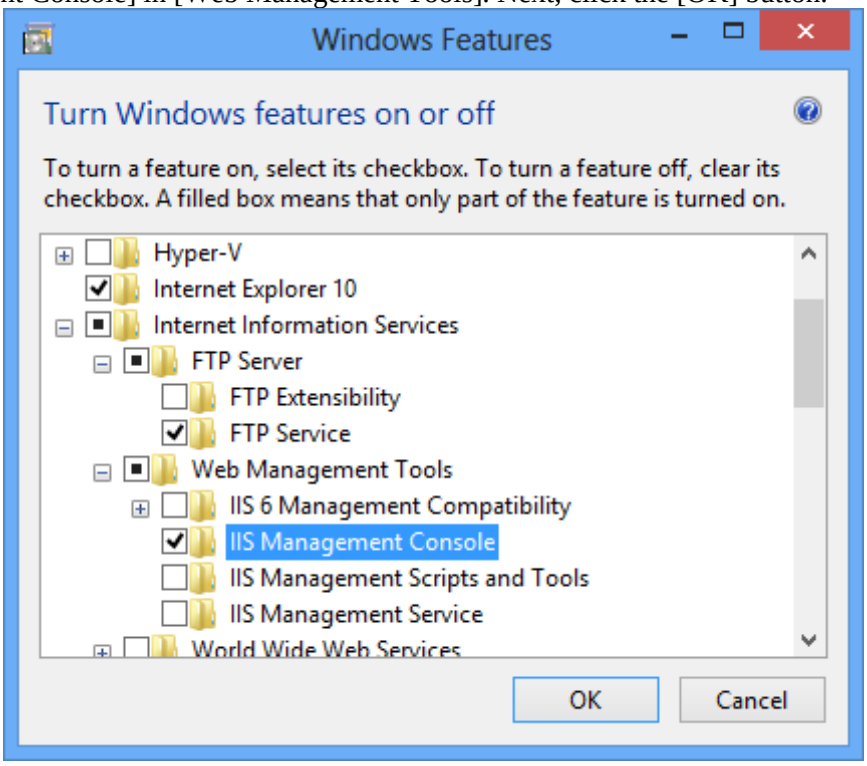
2 Click [Programs].



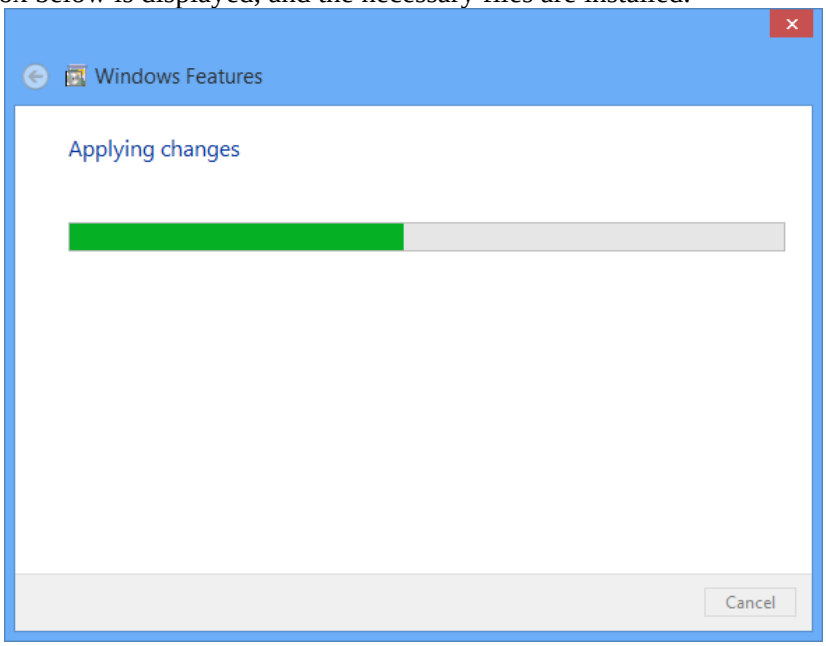
3 Click [Turn Windows features on or off].



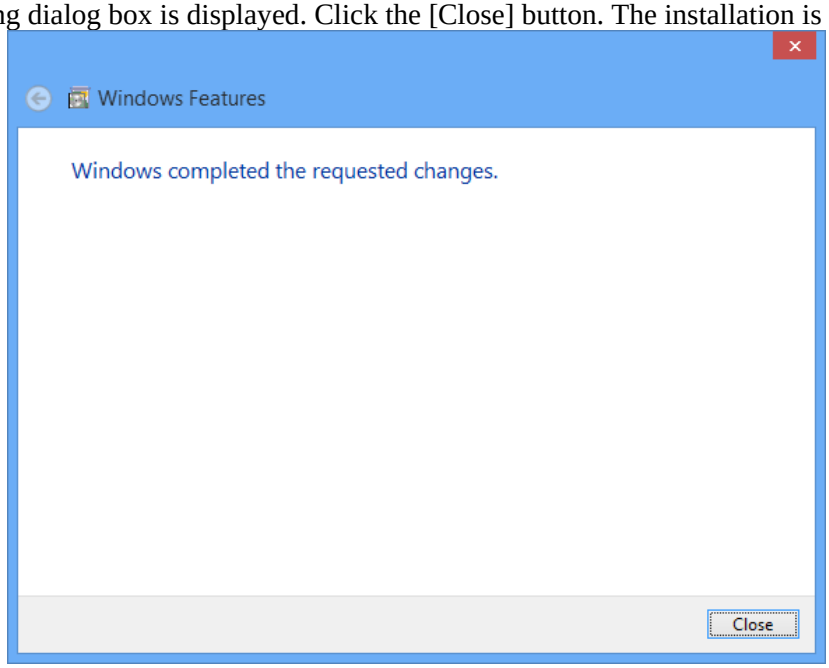
4 Expand [Internet Information Services], then check [FTP Service] in [FTP Server] and [IIS Management Console] in [Web Management Tools]. Next, click the [OK] button.



5 The dialog box below is displayed, and the necessary files are installed.

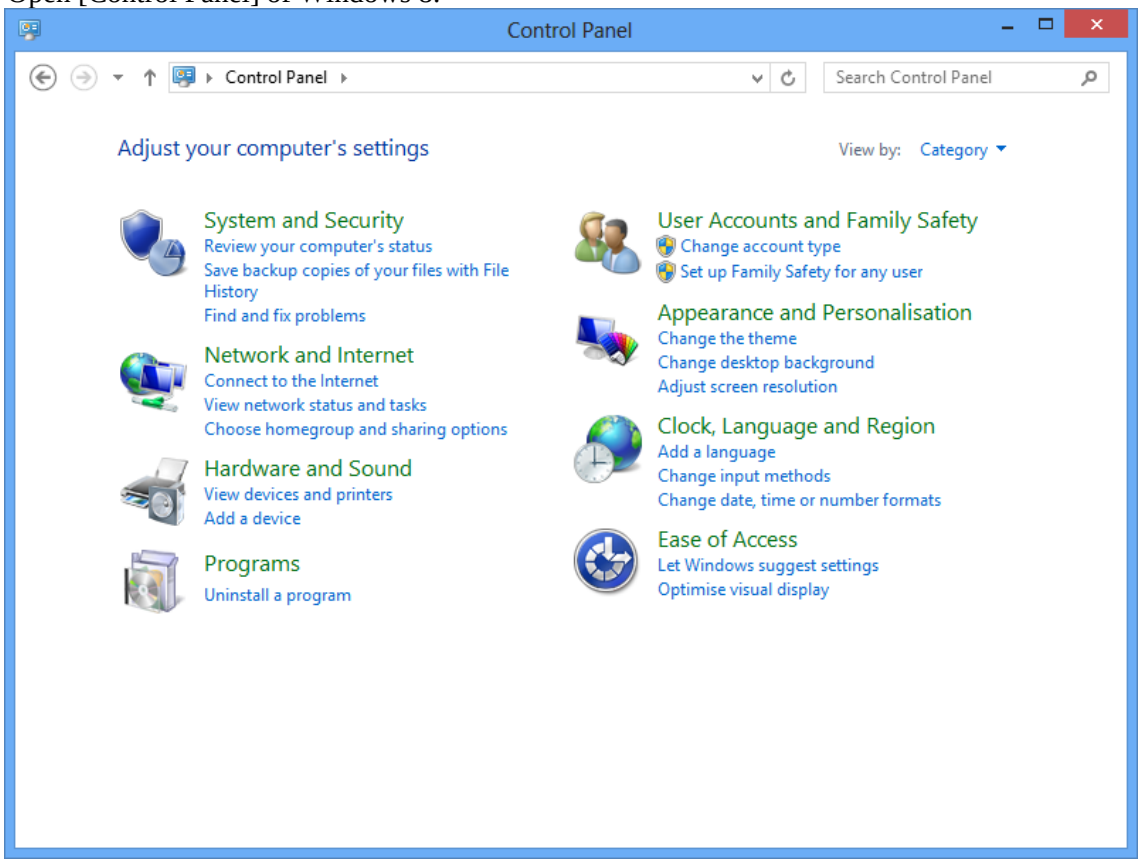


6 The following dialog box is displayed. Click the [Close] button. The installation is now completed.

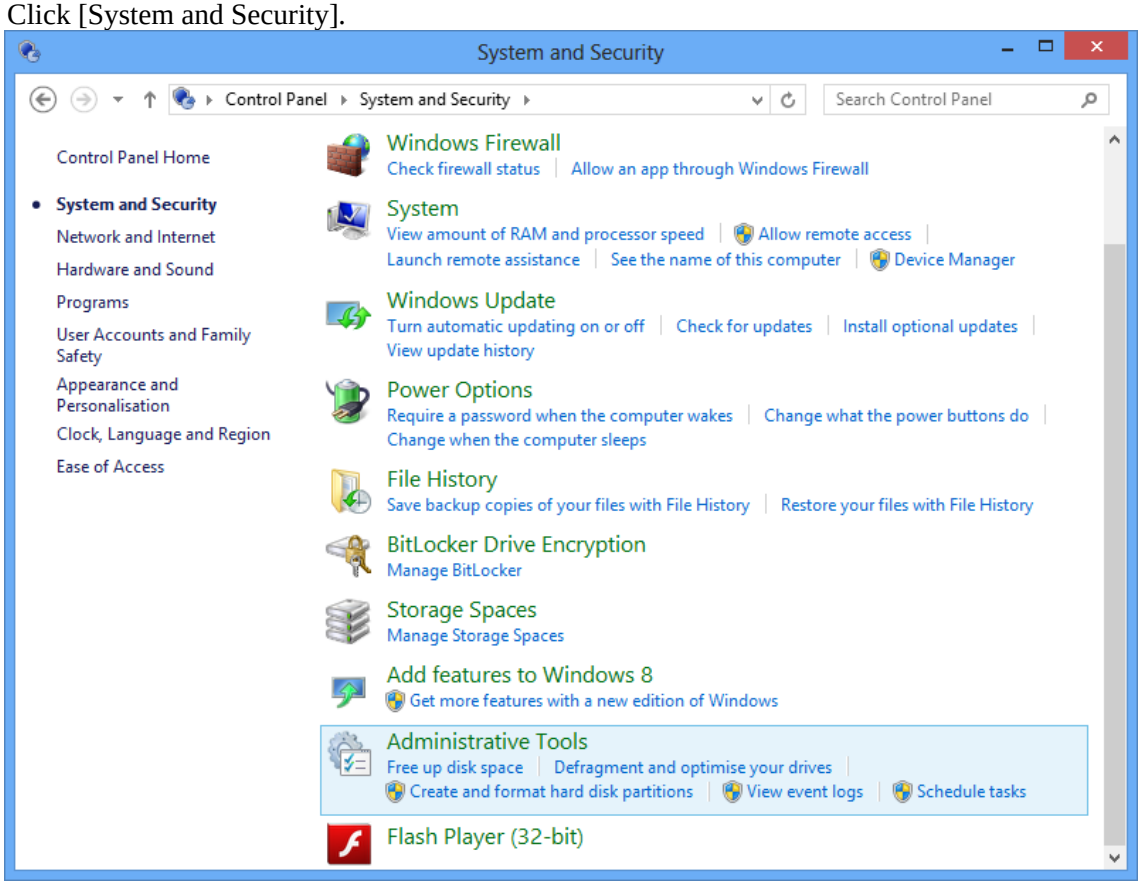


Setting the Internet Information Service

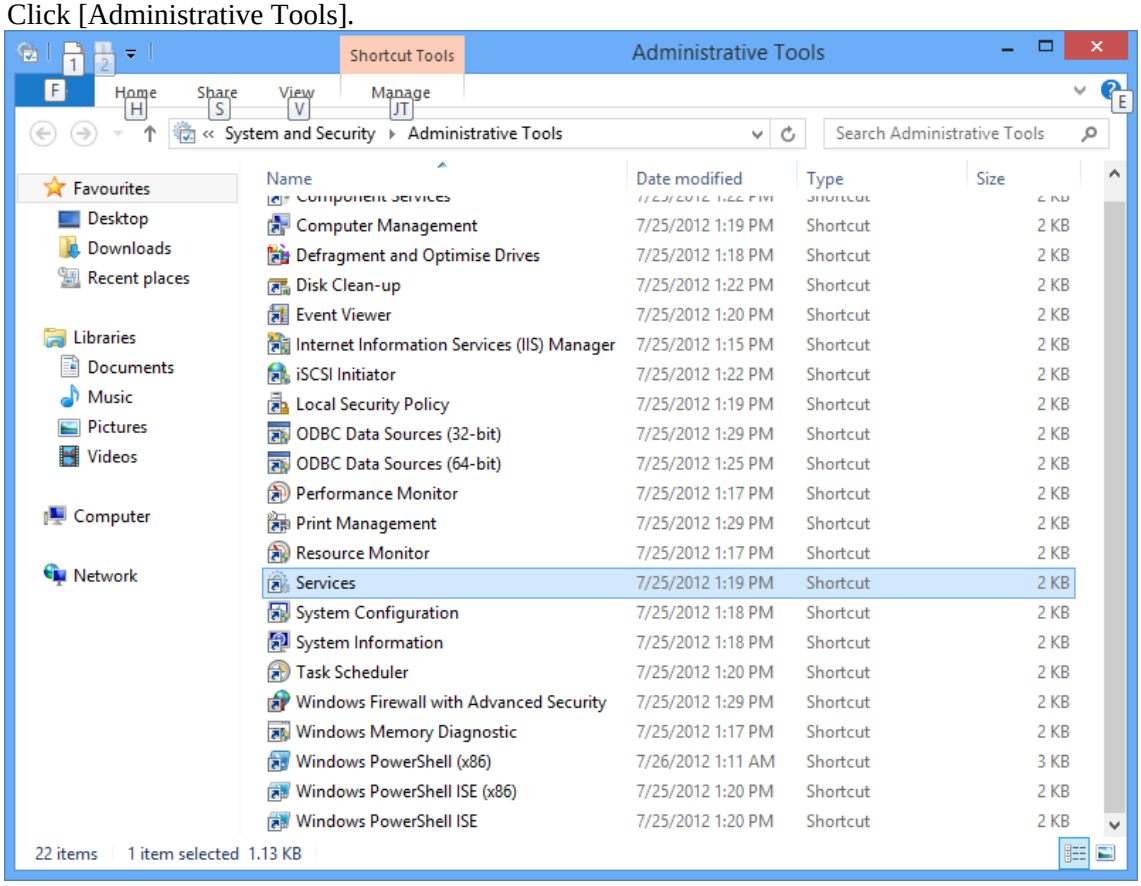
1 Open [Control Panel] of Windows 8.



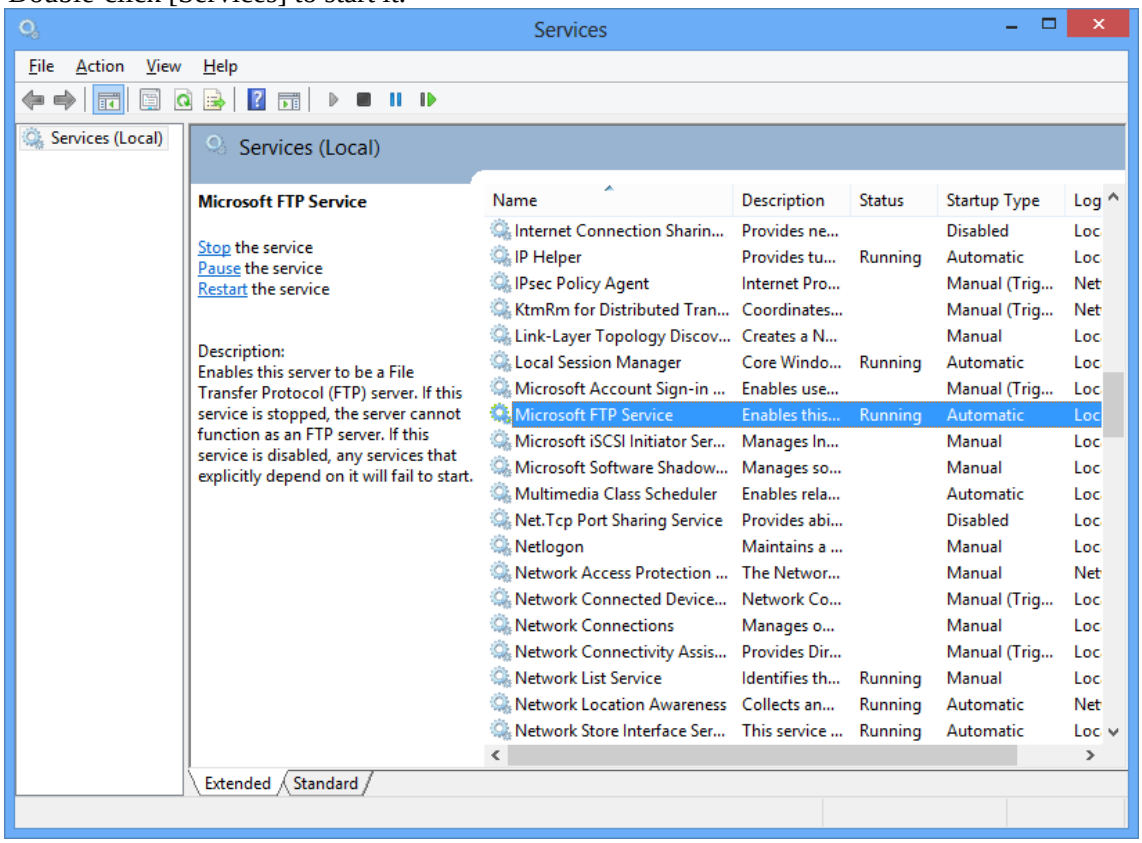
2 Click [System and Security].



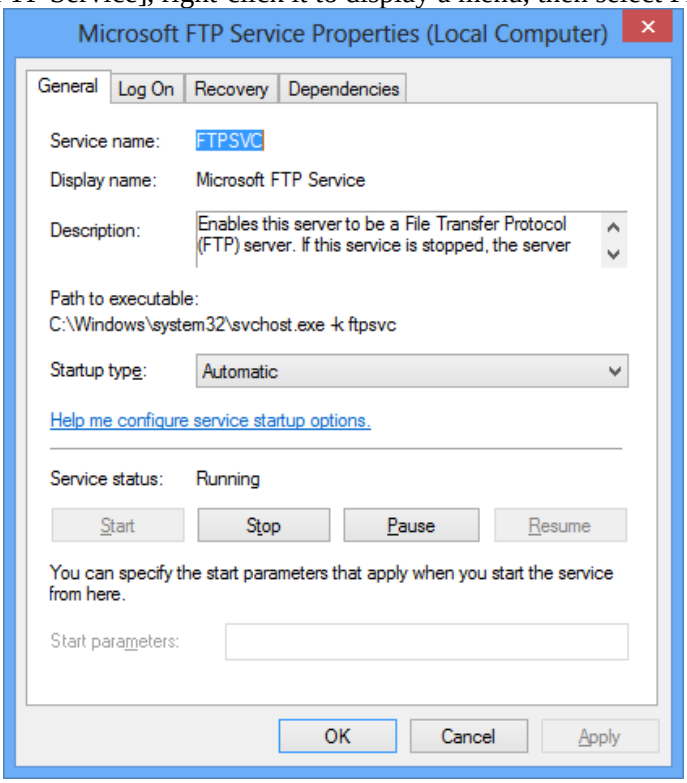
3 Click [Administrative Tools].



4 Double-click [Services] to start it.

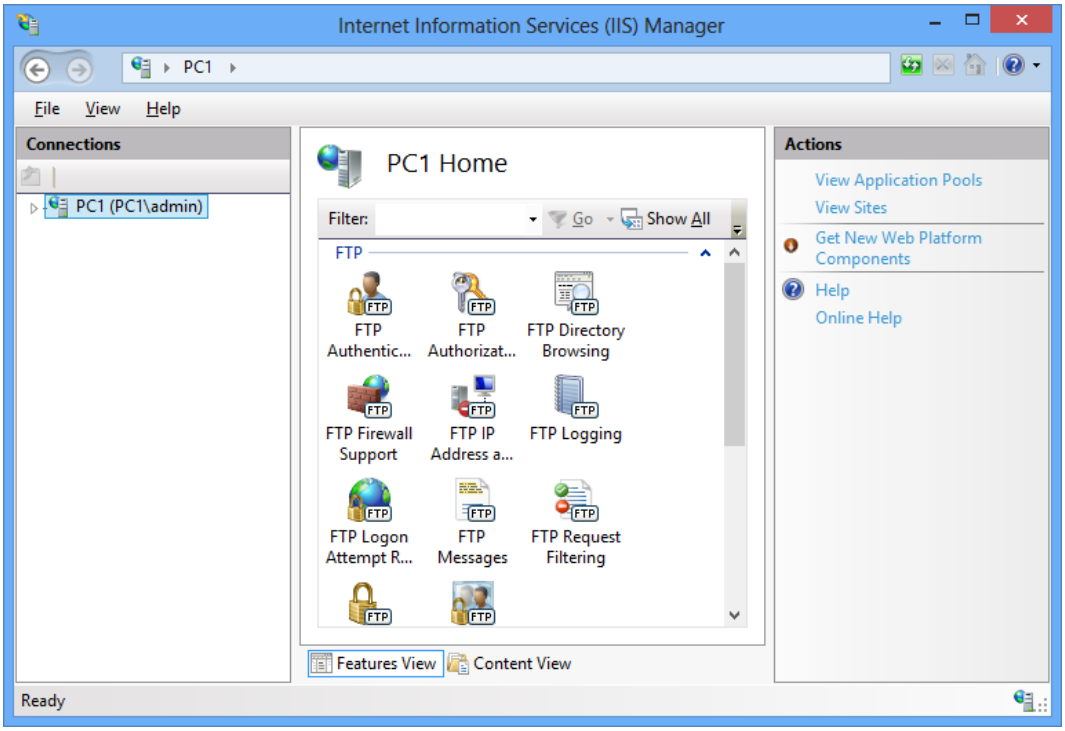


5 Select [Microsoft FTP Service], right-click it to display a menu, then select Properties.

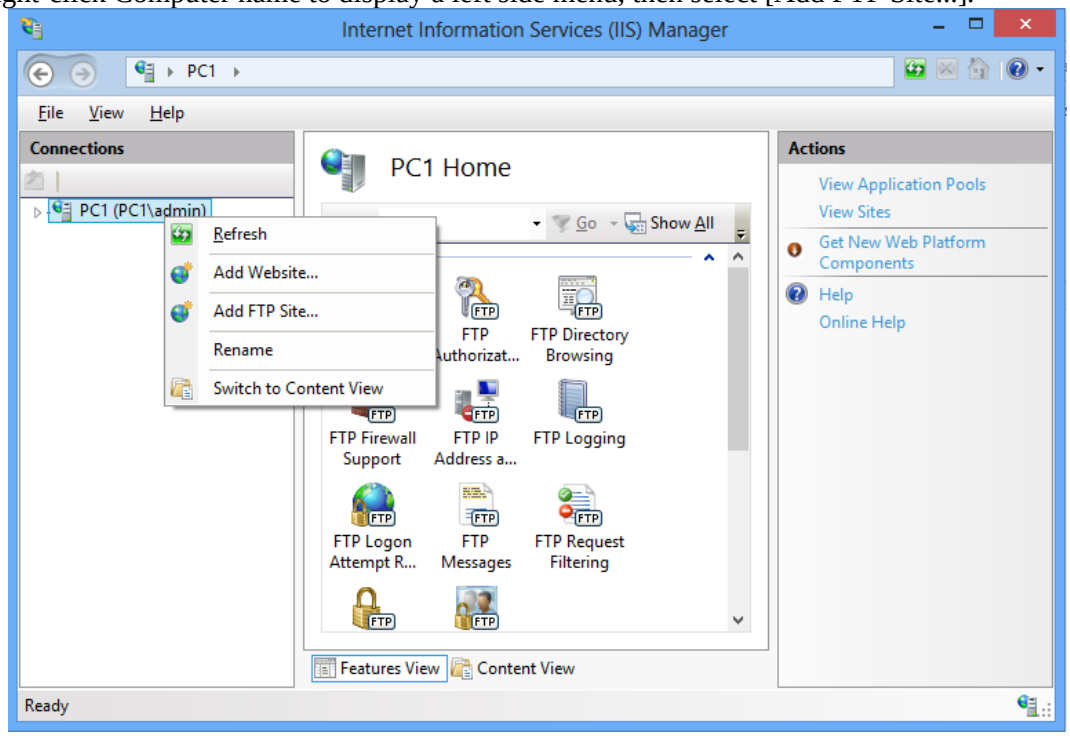


6 Display the [General] property sheet.
Choose [Automatic] from [Startup type] drop-down list. Next, if [Service status] is not [Running], click the [Start] button to start FTP service, then click the [OK] button to end [Services].

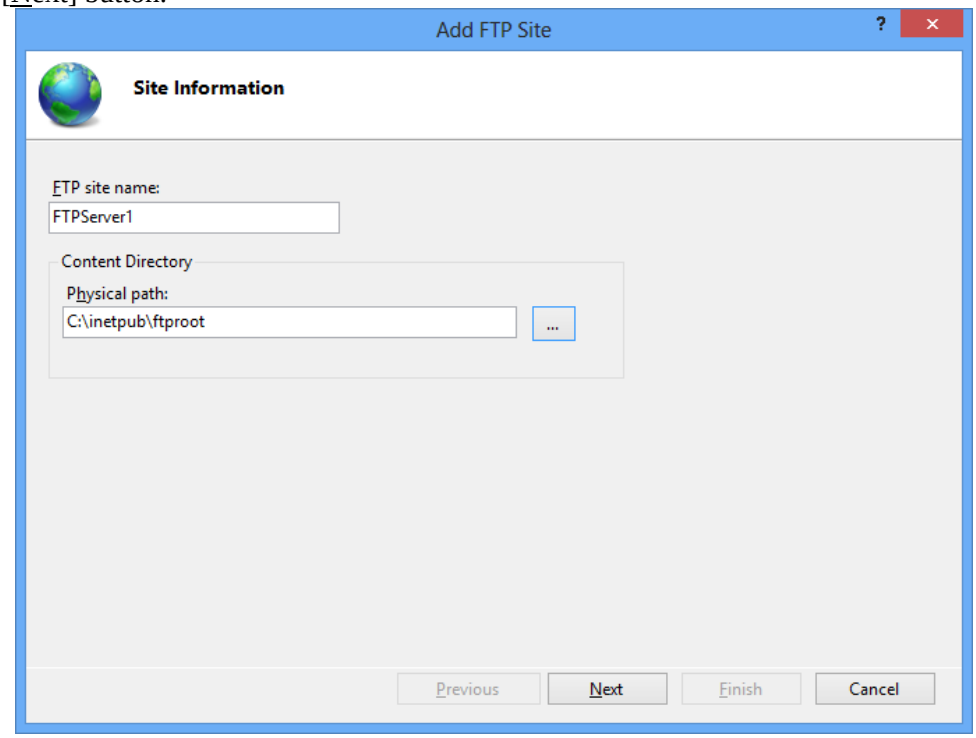
7 Return to [Administrative Tools], then double-click [Internet Information Services (IIS) Manager] to start it.



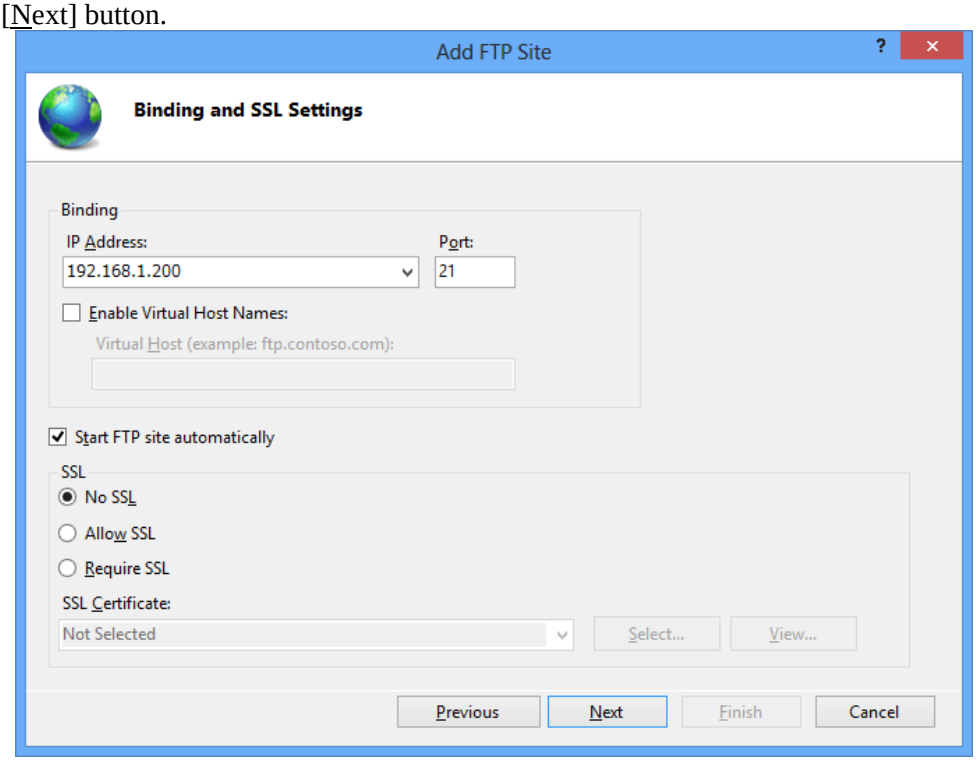
8 Right-click Computer name to display a left side menu, then select [Add FTP Site...].



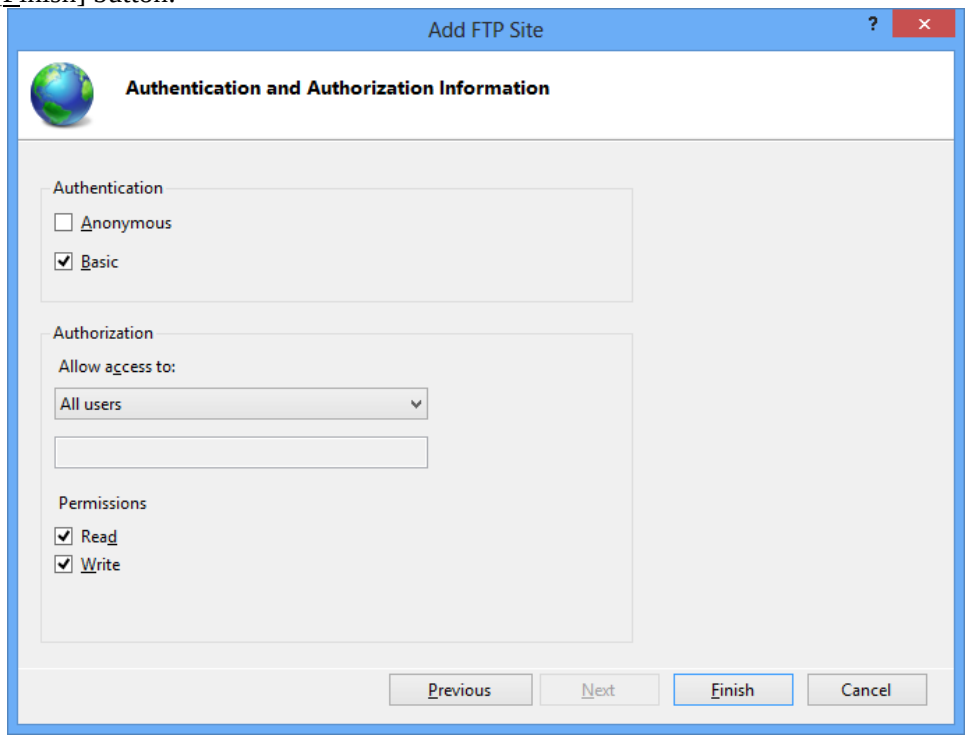
9 In the displayed [Site Information] dialog box below, set the name of an FTP site to be created in [FTP site name:] and the path to the FTP server home directory in [Physical path:] in [Content Directory]. The FTP clients can access only the directories under the home directory set in this step. Click [Next] button.



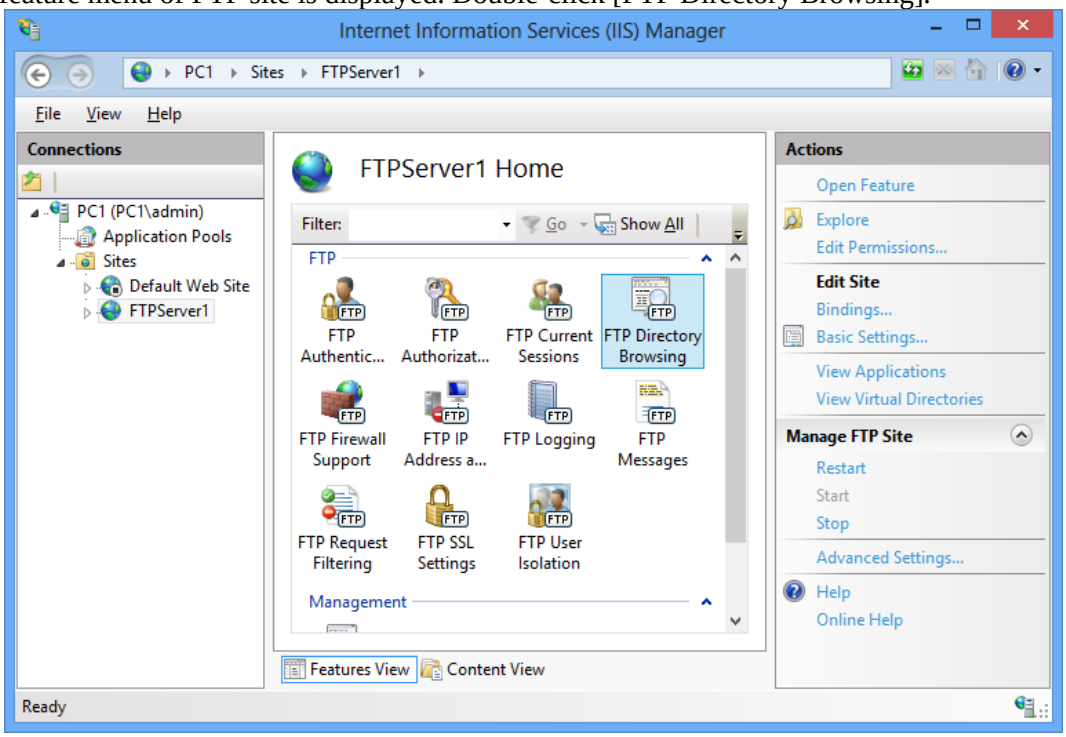
10 The [Binding and SSL setting] dialog box below is displayed.
Input the IP address and port number (usually 21) in [IP Address] and [Port].
Check [Start FTP site automatically] and select [No SSL] in [SSL].
Click [Next] button.



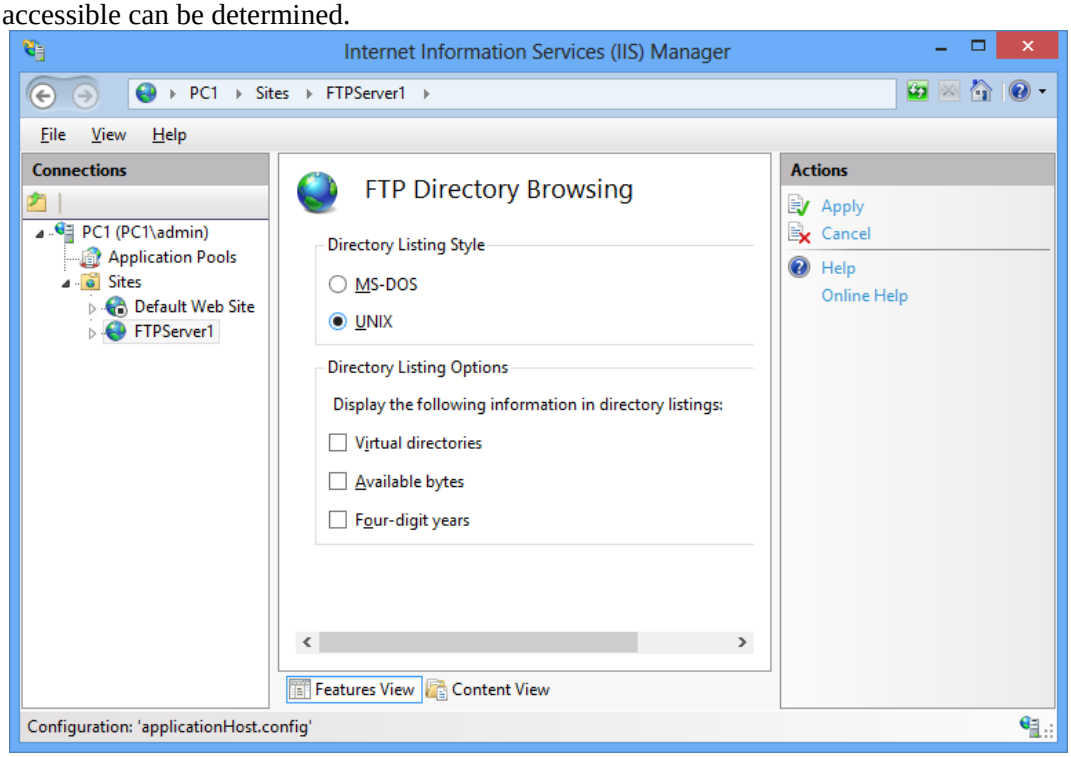
11 The [Authentication and Authorization Information] dialog box below is displayed.
Check [Basic] in [Authentication], choose [All users] from [Allow access to:] drop-down list in [Authorization], and check [Read] and [Write] in [Permissions].
Click [Finish] button.



12 Expand tree in left pane and select FTP site name set in step 9.
A feature menu of FTP site is displayed. Double-click [FTP Directory Browsing].



13 In [Directory Listing Style], [MS-DOS] is selected by default.
However, it is recommended to select [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.

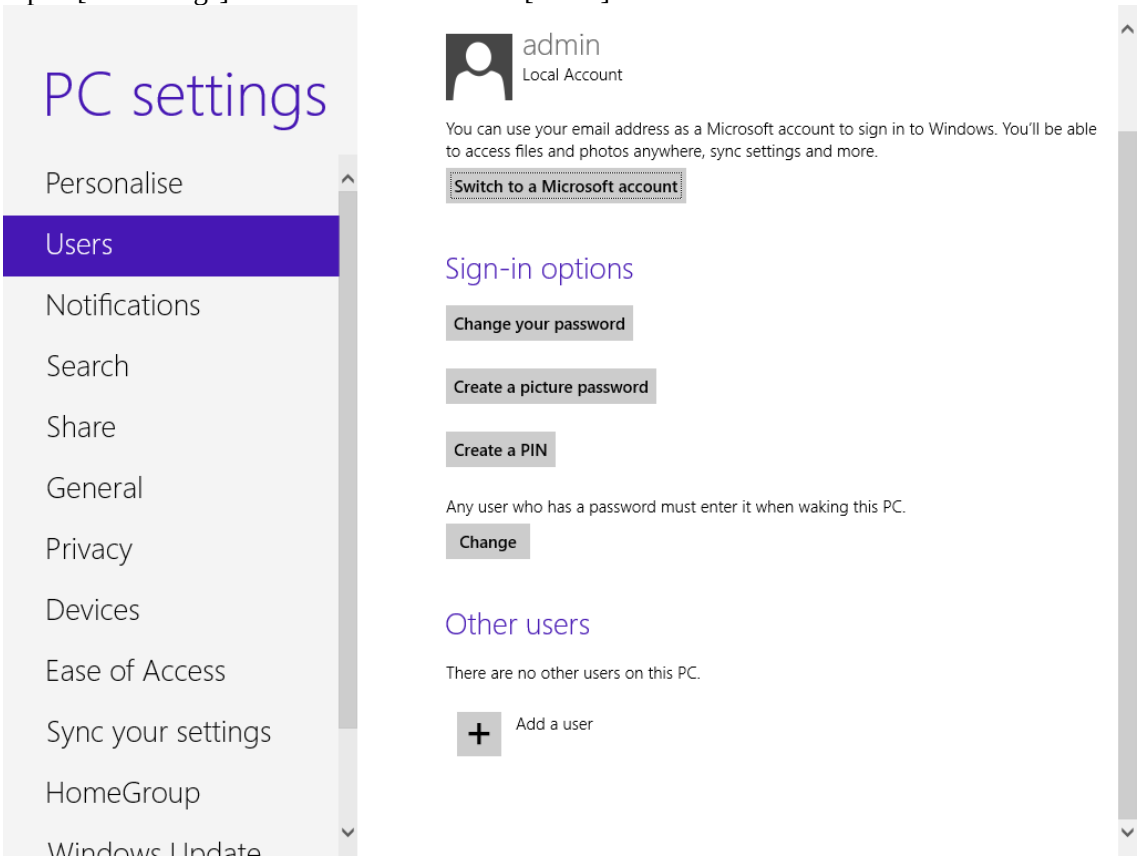


14 To access a directory other than the directories under the home directory set in step 9 above, a virtual directory needs to be set.
For details of a virtual directory, use information such as the online help information of Windows 8.

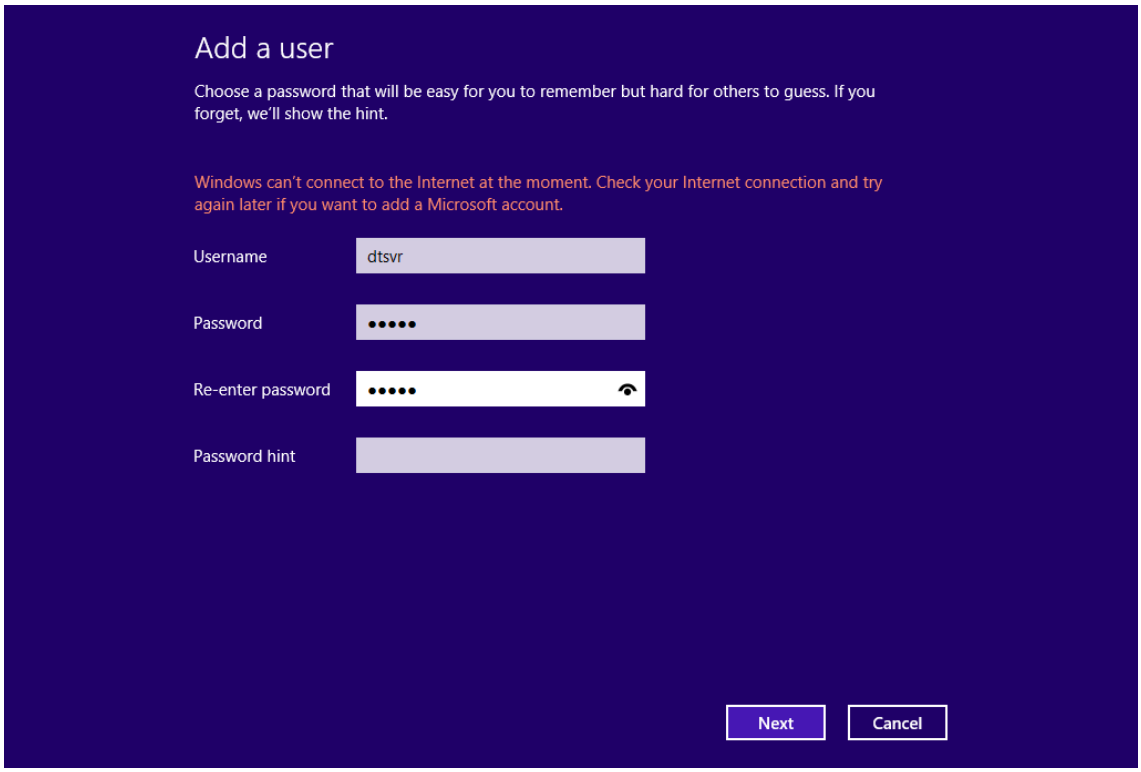
Login User Setting

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

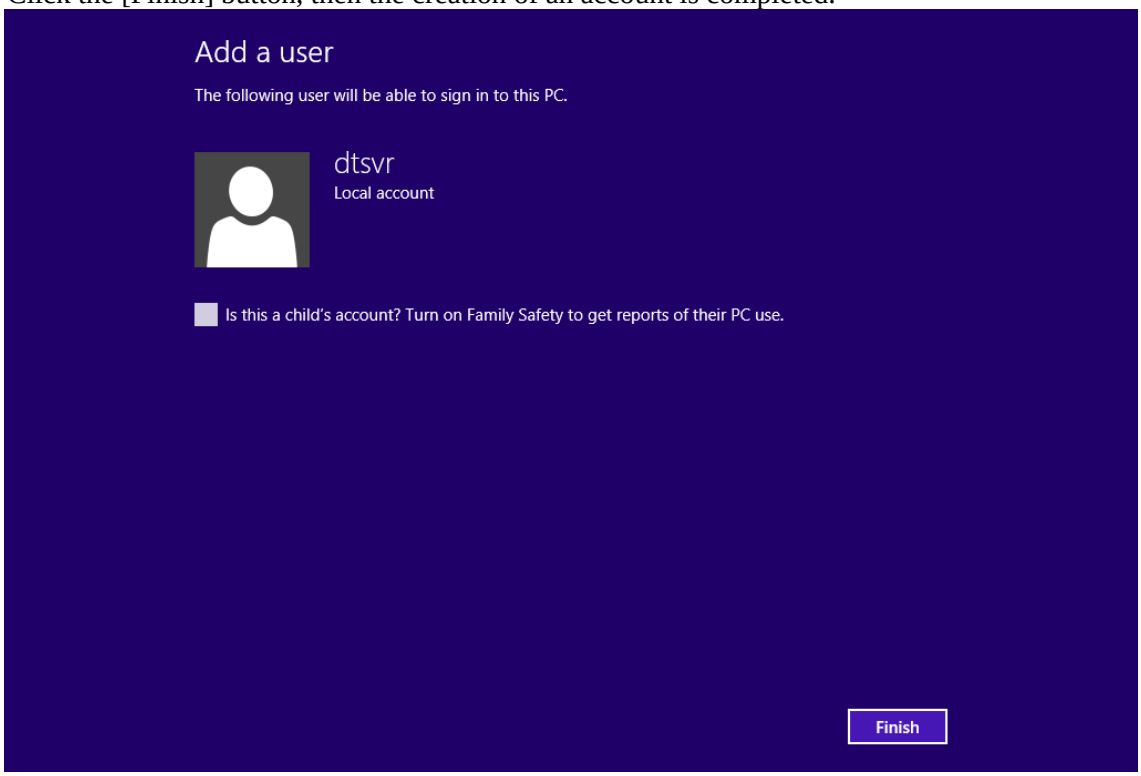
1 Open [PC settings] of Windows 8 and click [Users].



2 Click [Add a user]. Input values in [Username], [Password], and [Password hint] and click the [Next] button.



3 Click the [Finish] button, then the creation of an account is completed.



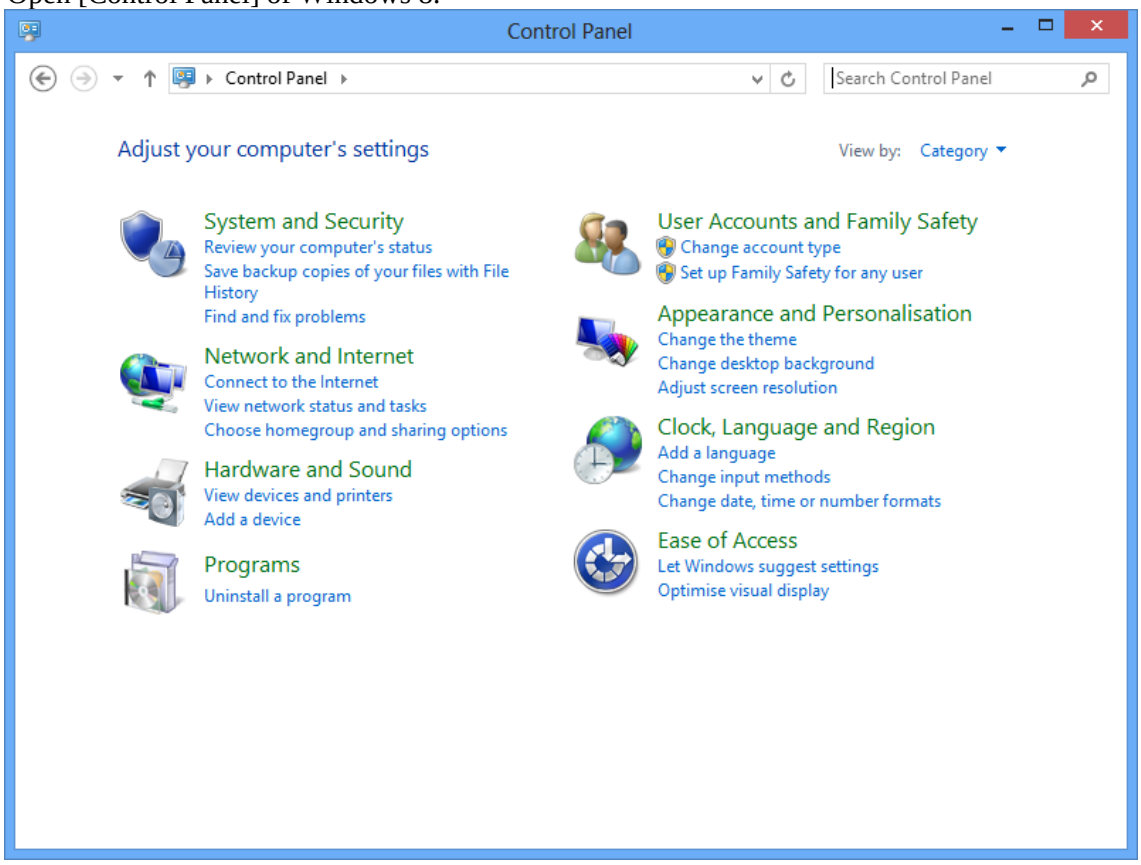
Changing the account type

The user account created as described above is registered as a standard user.
Change the account type to Administrator as required.

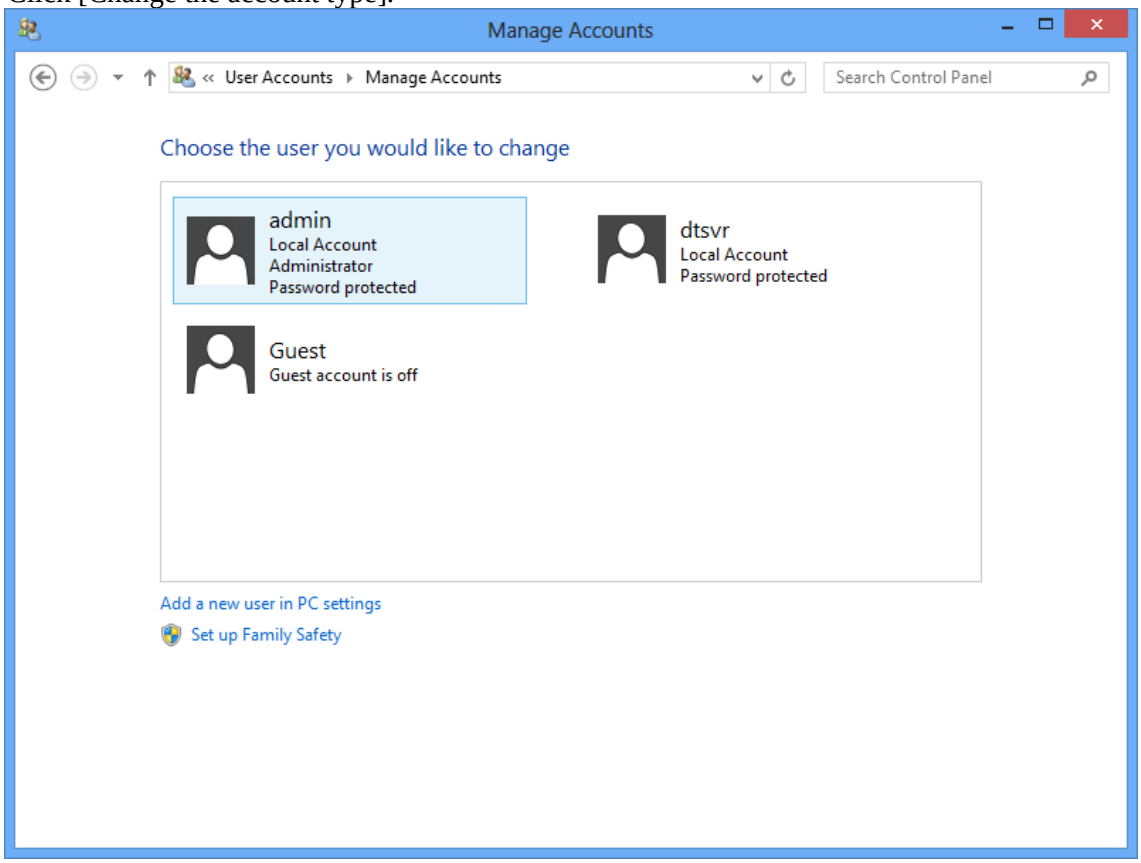
NOTE

If the type of account is not to be changed to Administrator, a file may not be able to be read or written with the account. In this case, grant an access right to read and write the home directory set in step 9 in "Setting the Internet Information Service" described above to the user account.

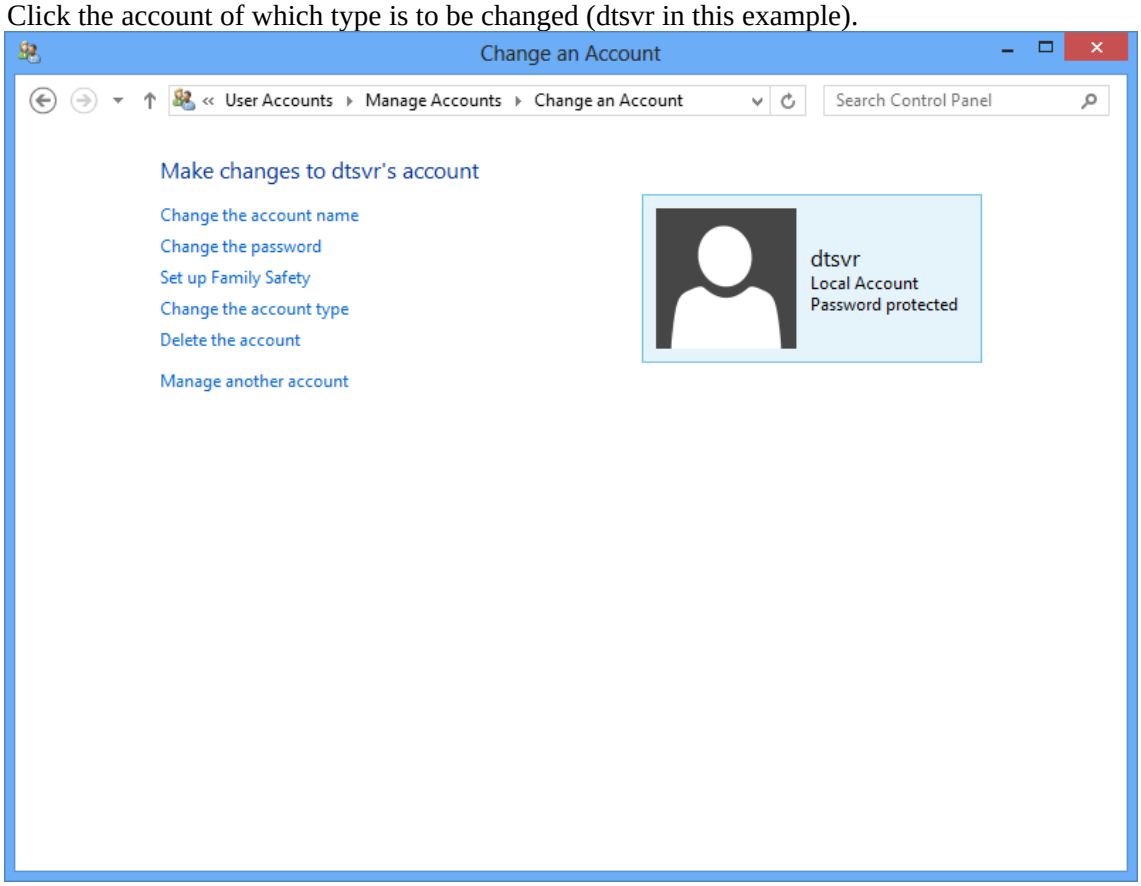
1 Open [Control Panel] of Windows 8.



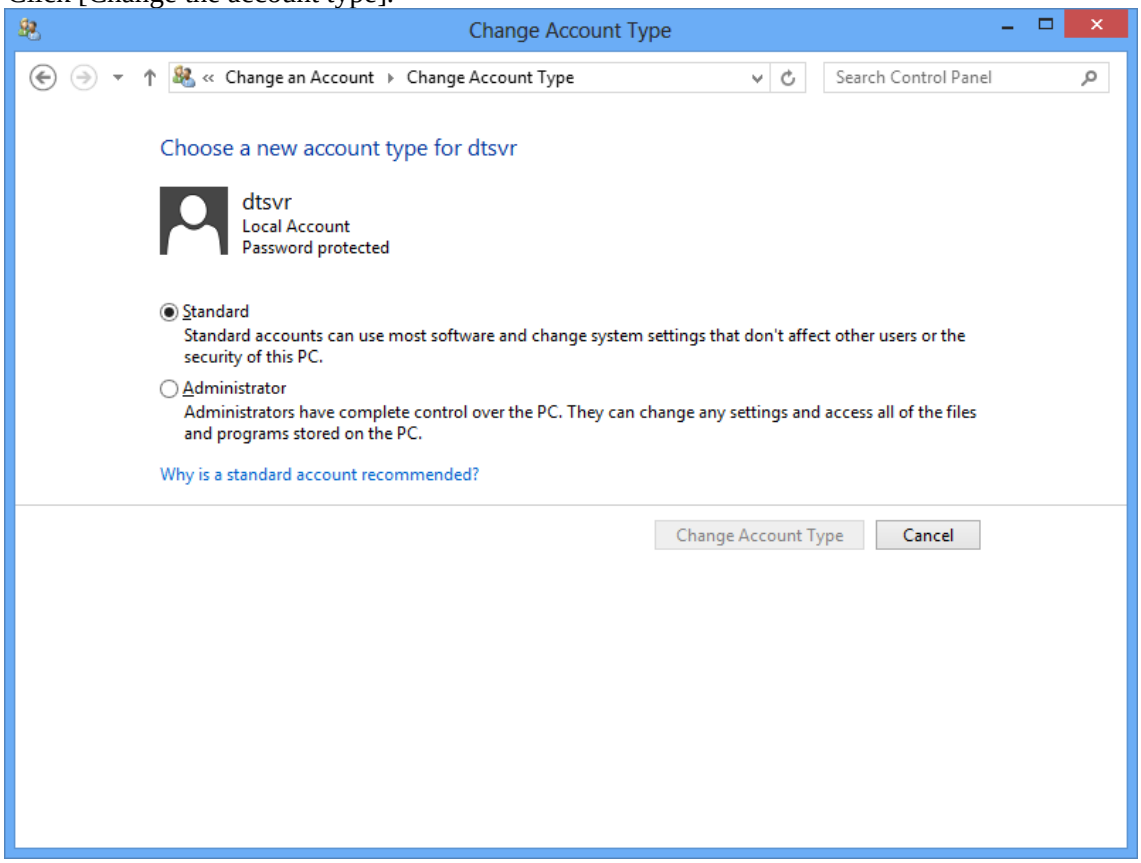
2 Click [Change the account type].



3 Click the account of which type is to be changed (dtsvr in this example).



4 Click [Change the account type].

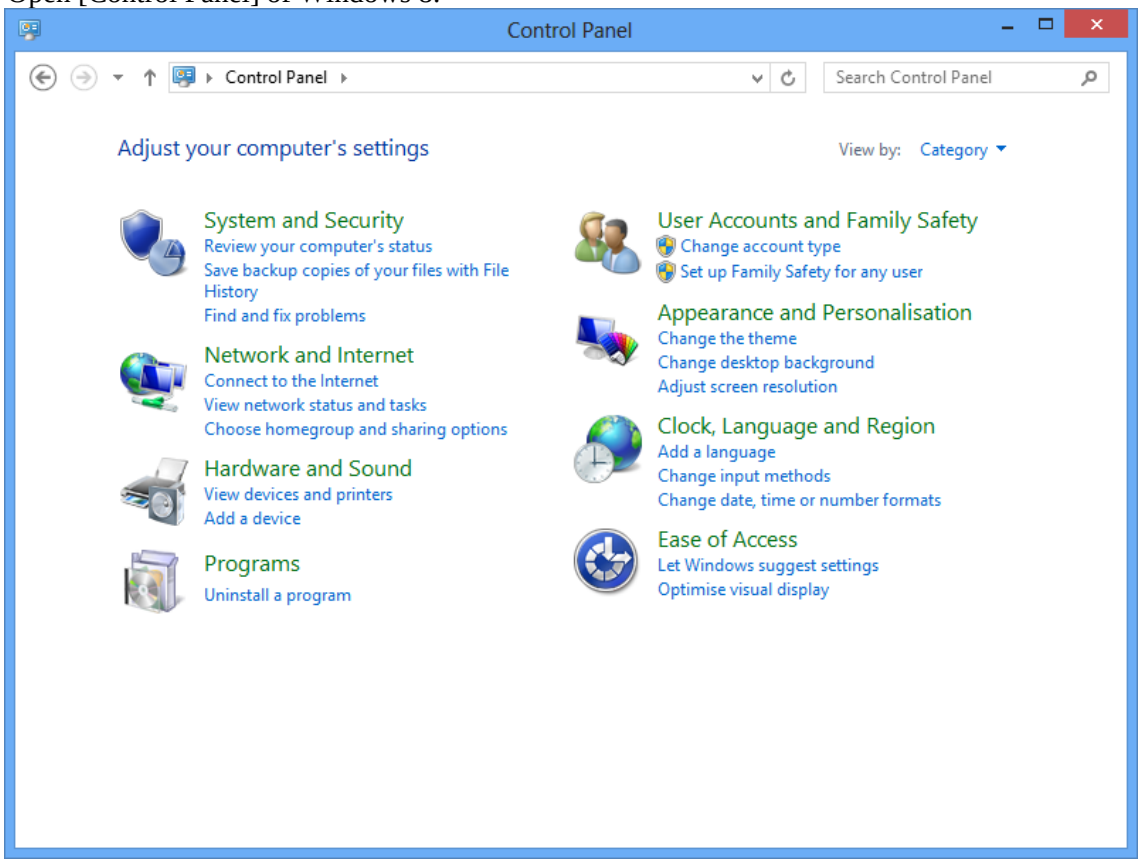


5 Change the account type to Administrator and click the [Change Account Type] button.

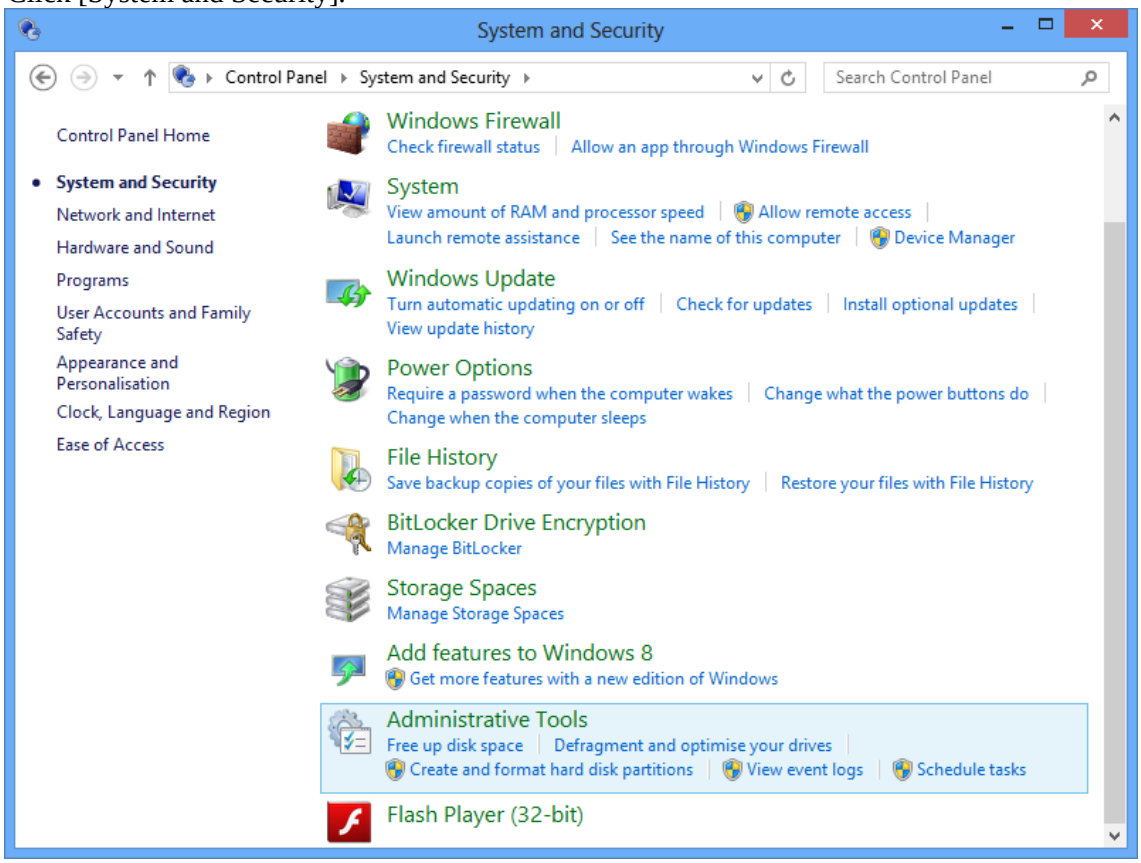
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password. If necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

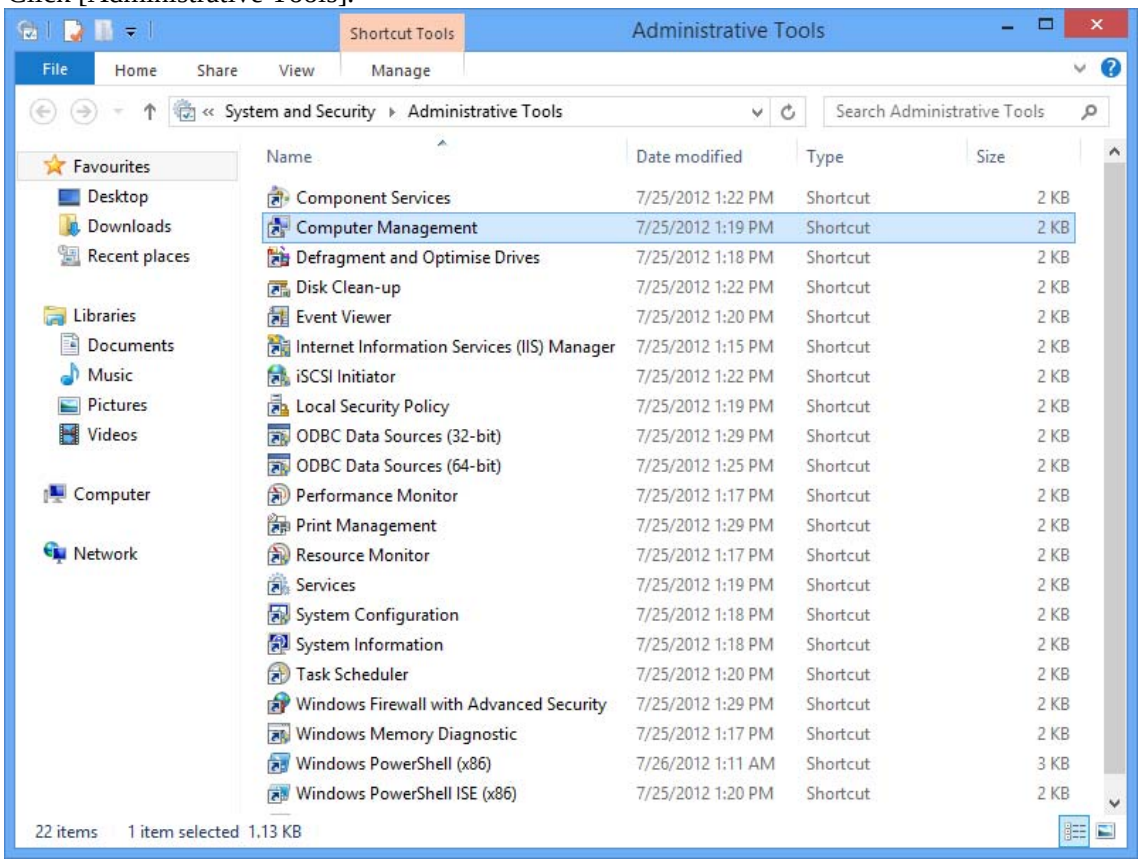
1 Open [Control Panel] of Windows 8.



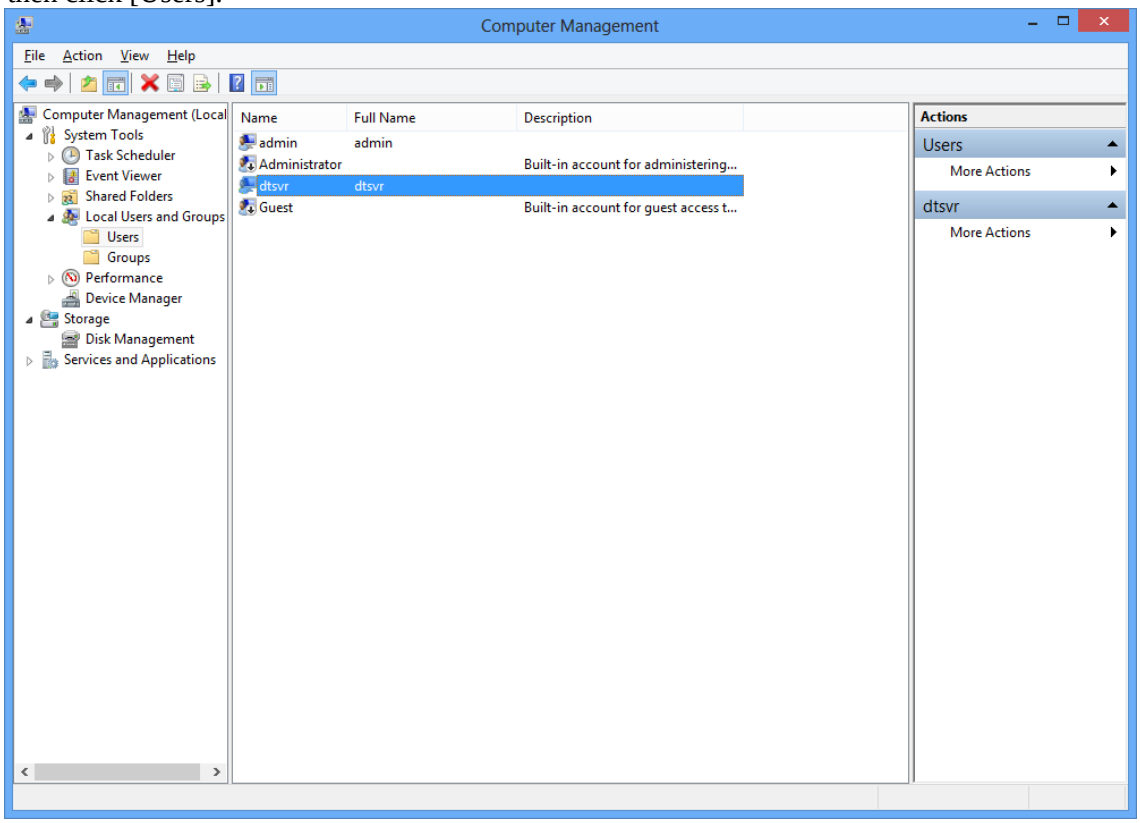
2 Click [System and Security].



3 Click [Administrative Tools].

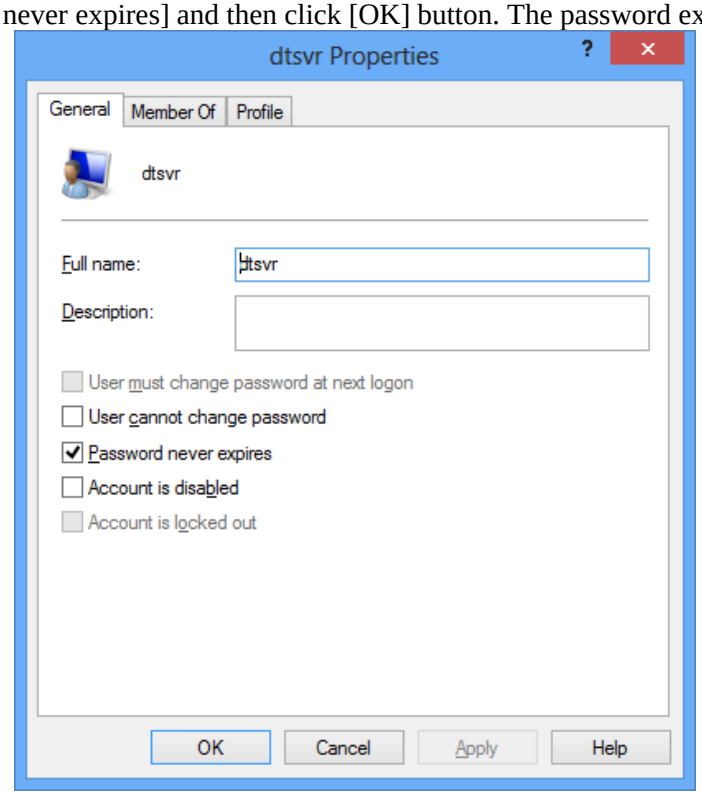


4 Double-click [Computer Management] to start it. Expand [Local Users and Groups] in left pane, then click [Users].



5 A list of registered users is displayed. Double-click the user name for which you want to change the password setting.

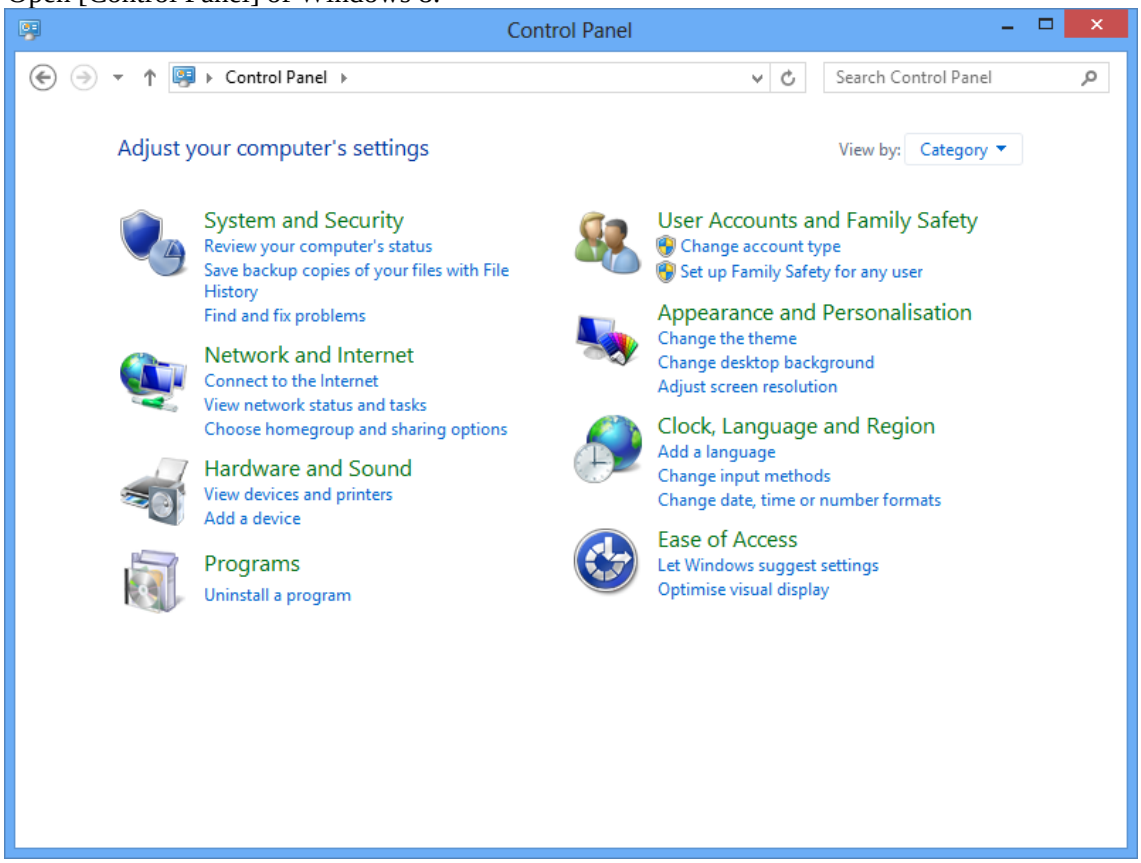
6 Check [Password never expires] and then click [OK] button. The password expiration is stopped.



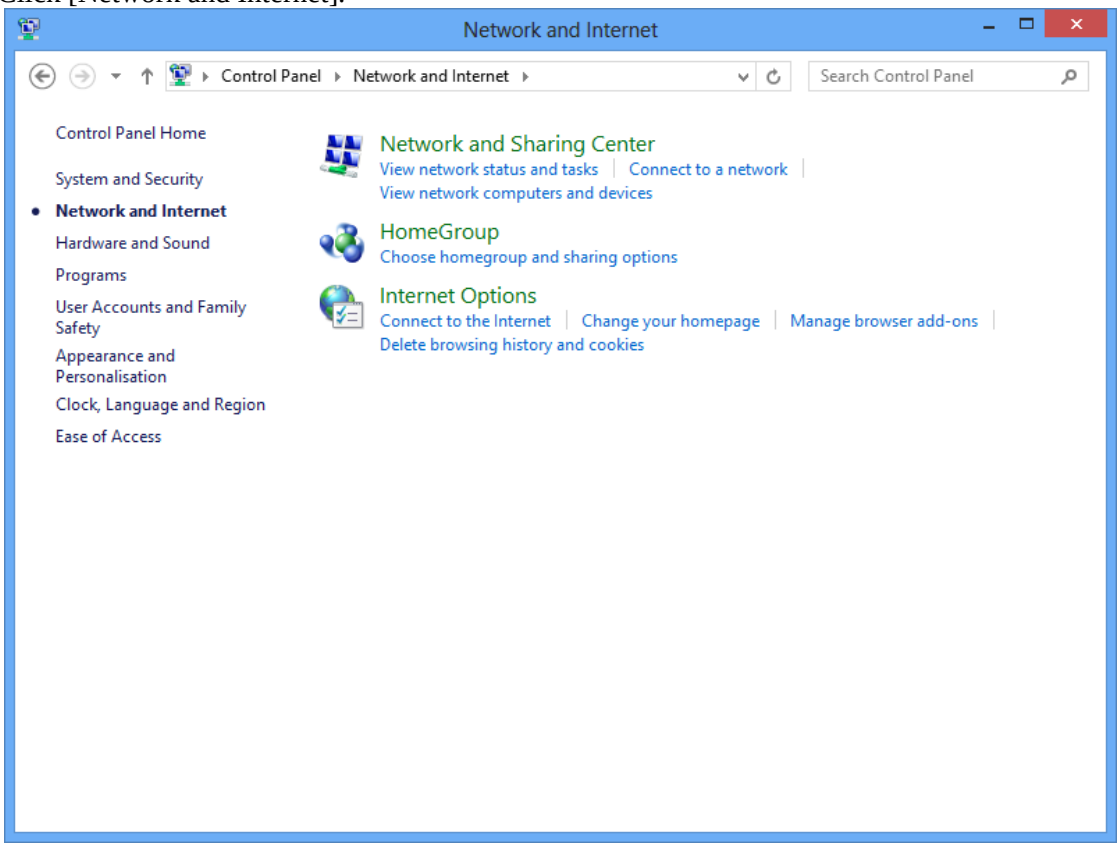
Checking the Windows 8 network

Windows 8 manages networks by network connection location. In addition, it is necessary to set the Windows 8 standard firewall function, which will be described later, by network location type. Before setting the firewall, check the type of network location you use as described below.

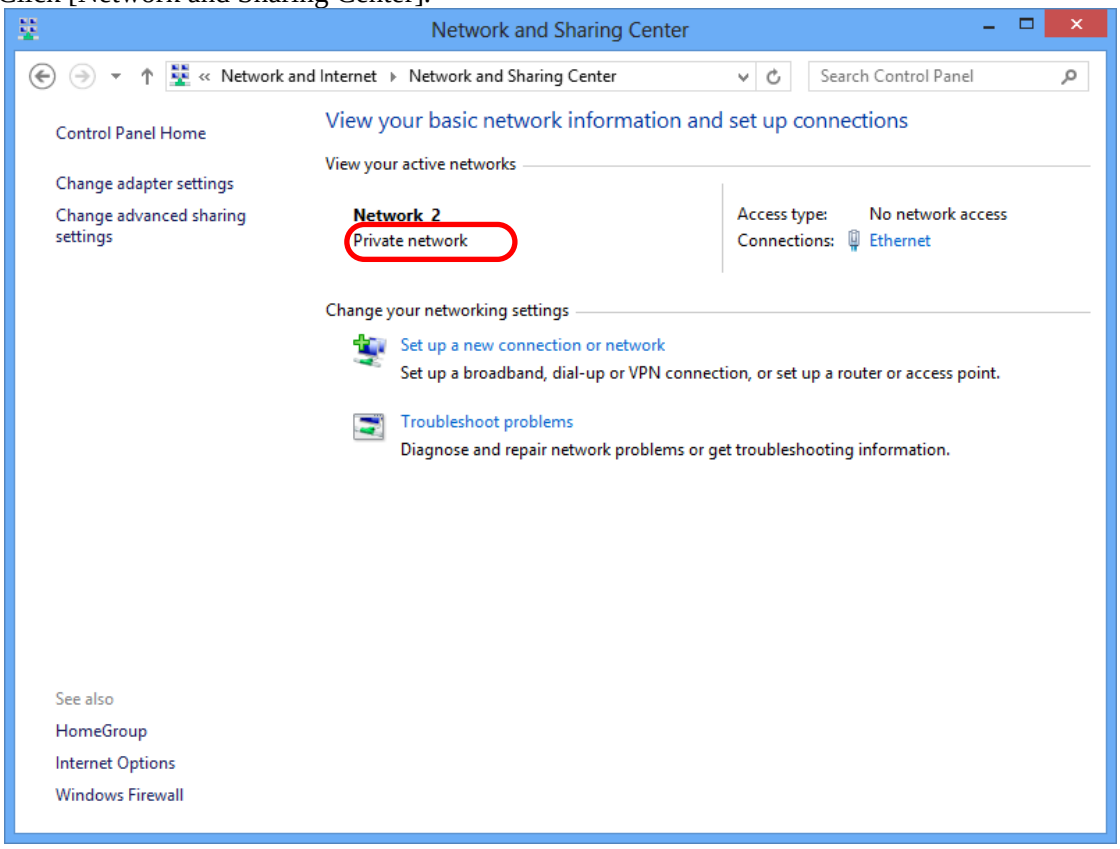
1 Open [Control Panel] of Windows 8.



2 Click [Network and Internet].



3 Click [Network and Sharing Center].



4 The string (in a red circle) displayed under [View your active networks] indicates the network location type. There are two typical types of network locations: Private network and public network.

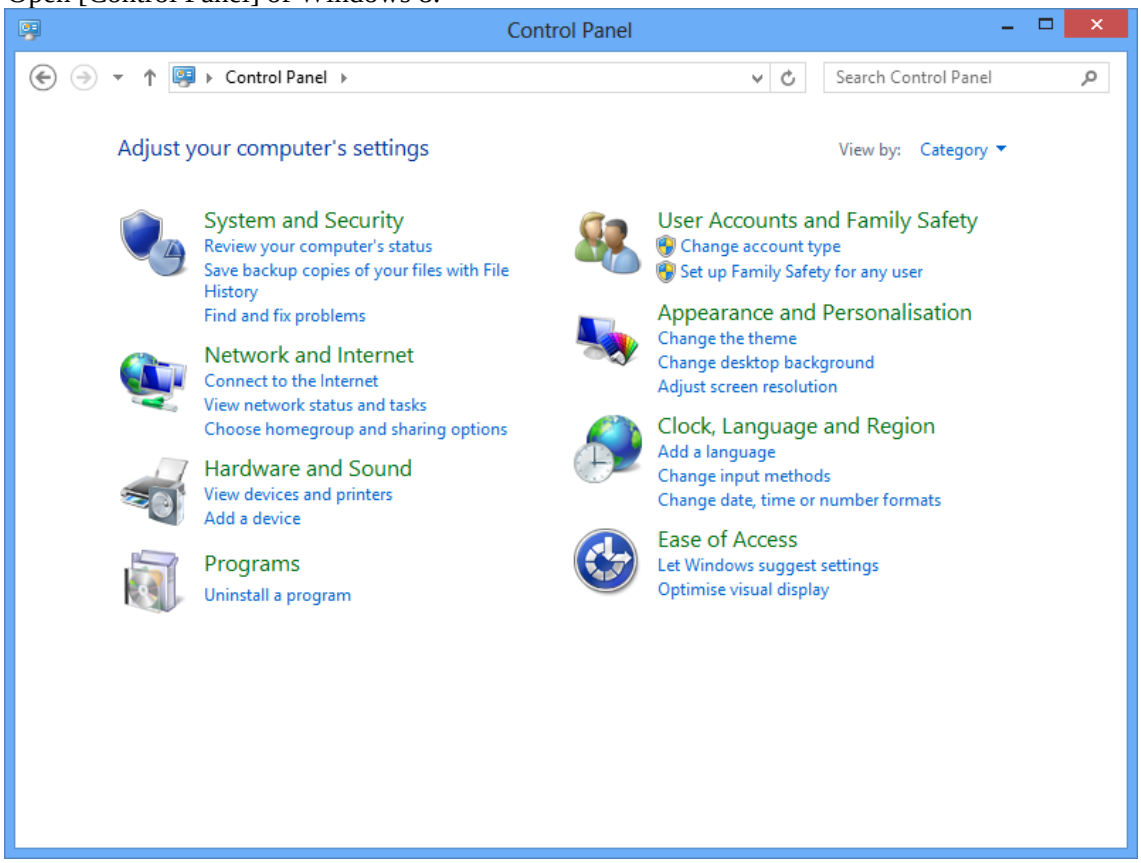
Confirming the Firewall function of Windows 8

Because the Internet Connection Firewall function is included in the Windows 8, the Data Server may not communicate with the FTP server.
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

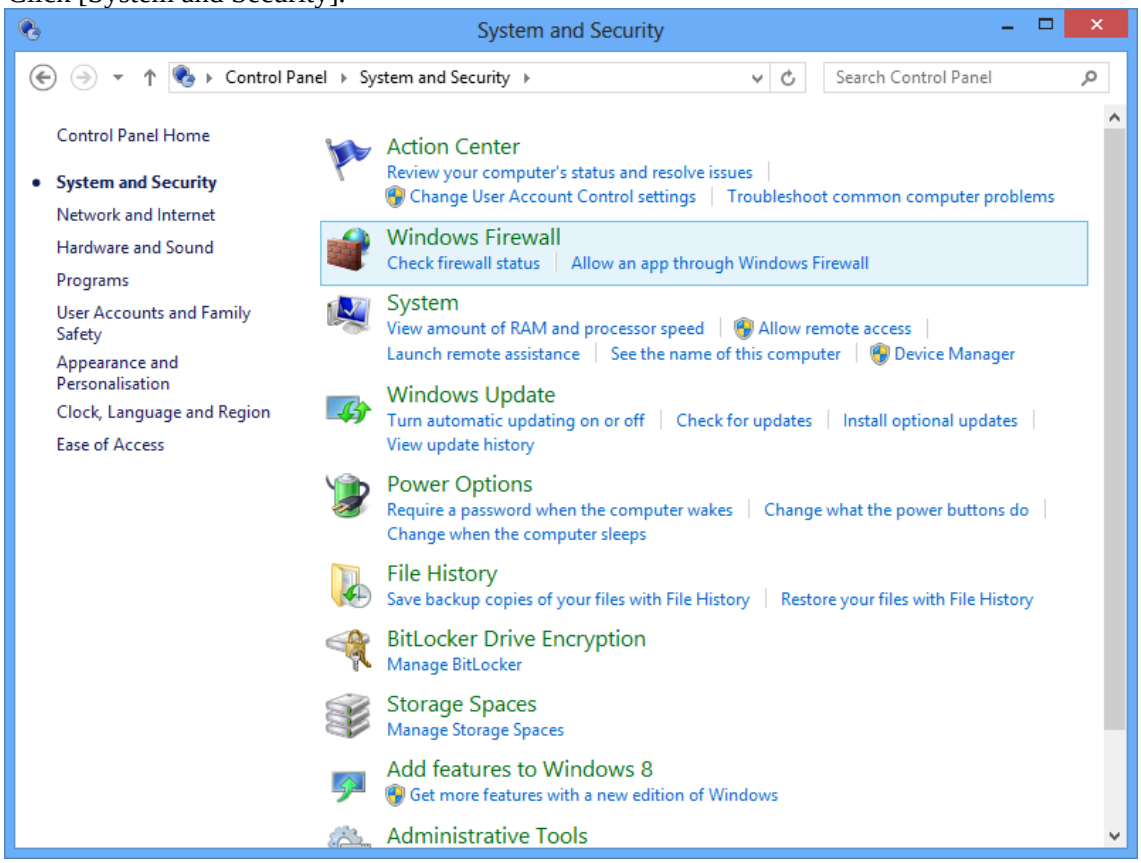
NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.
Therefore, when making the following settings, consult with your network administrator, and take special care.
In some cases, it becomes necessary to isolate the network from the outside as required.

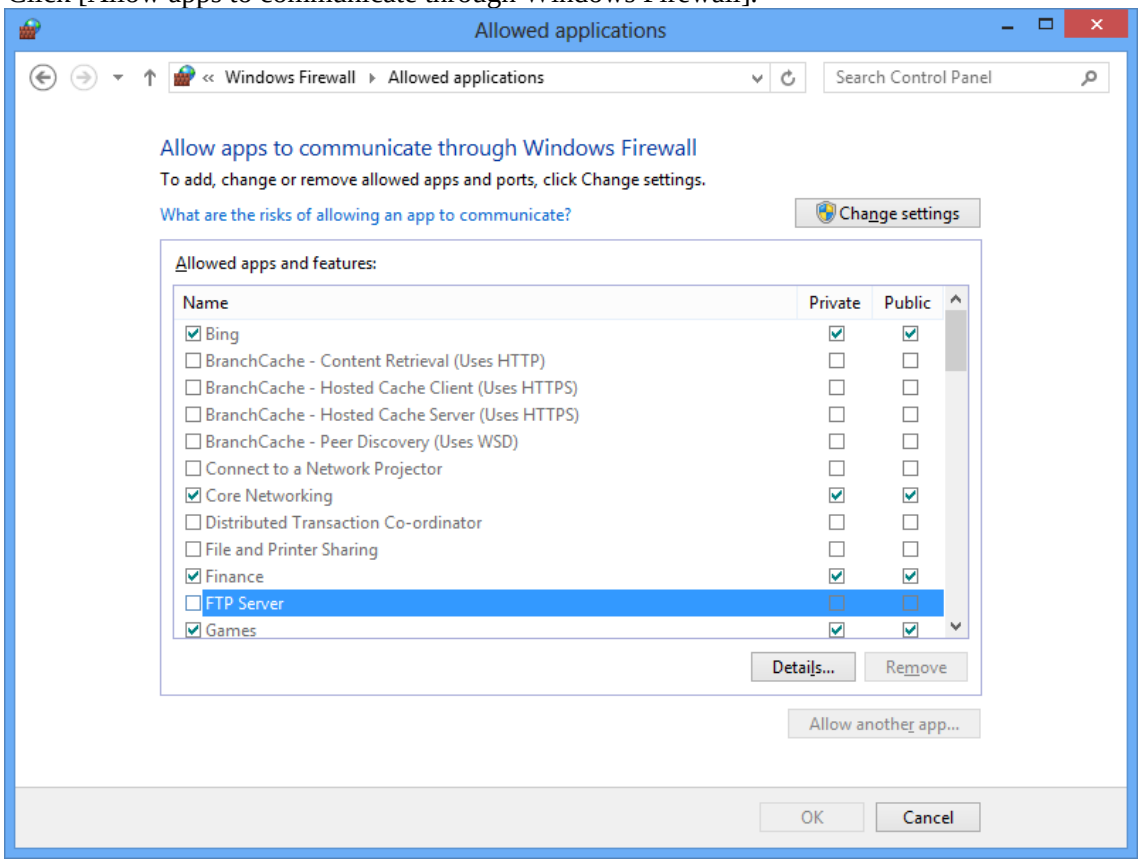
1 Open [Control Panel] of Windows 8.



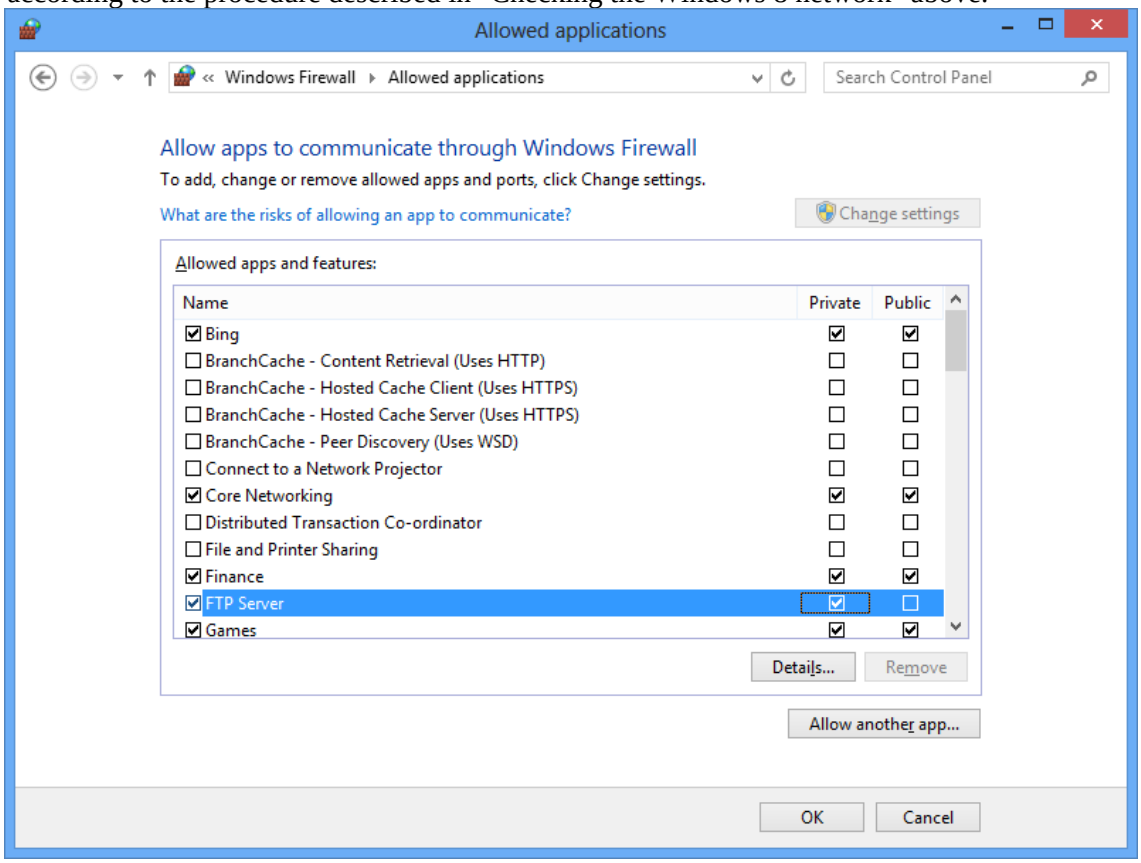
2 Click [System and Security].



3 Click [Allow apps to communicate through Windows Firewall].

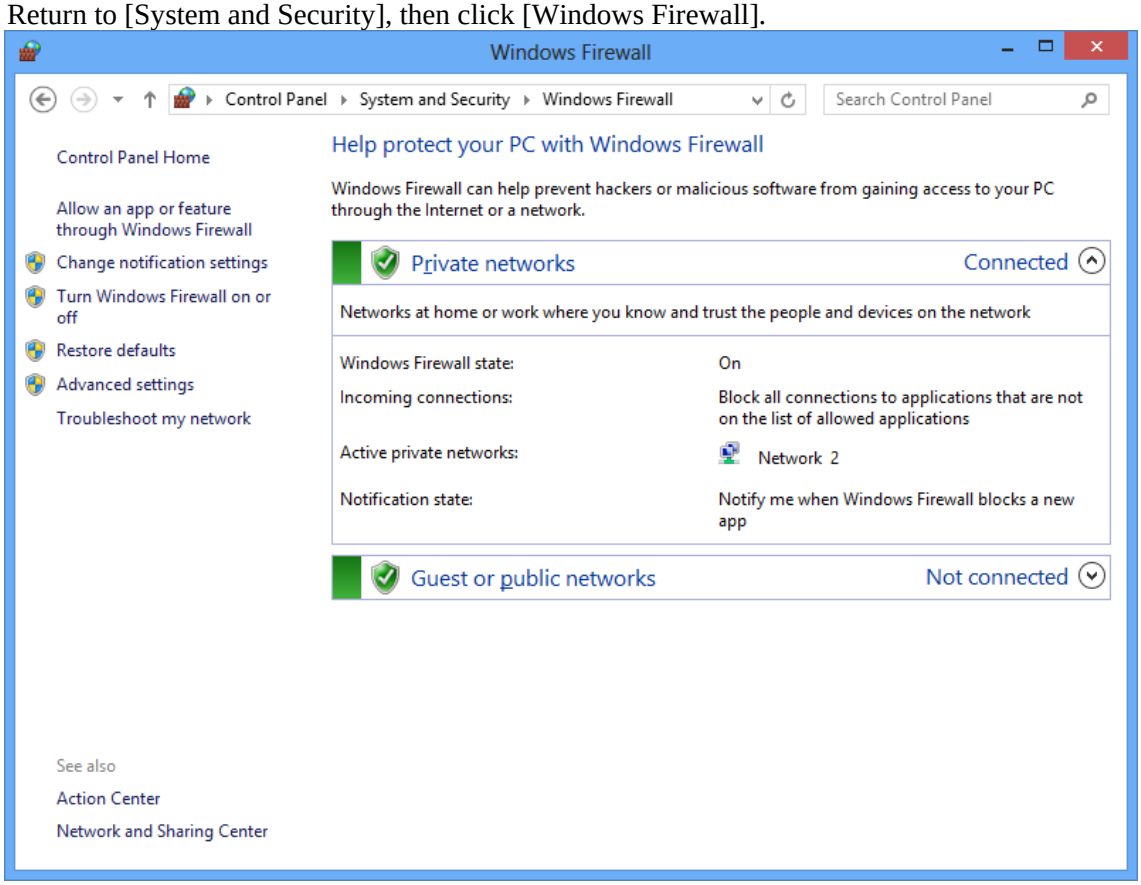


4 Click [Change settings] and check [FTP Server] and the network location(s) according to the network setting in the [Allowed apps and features] list. You can check the network location type according to the procedure described in "Checking the Windows 8 network" above.

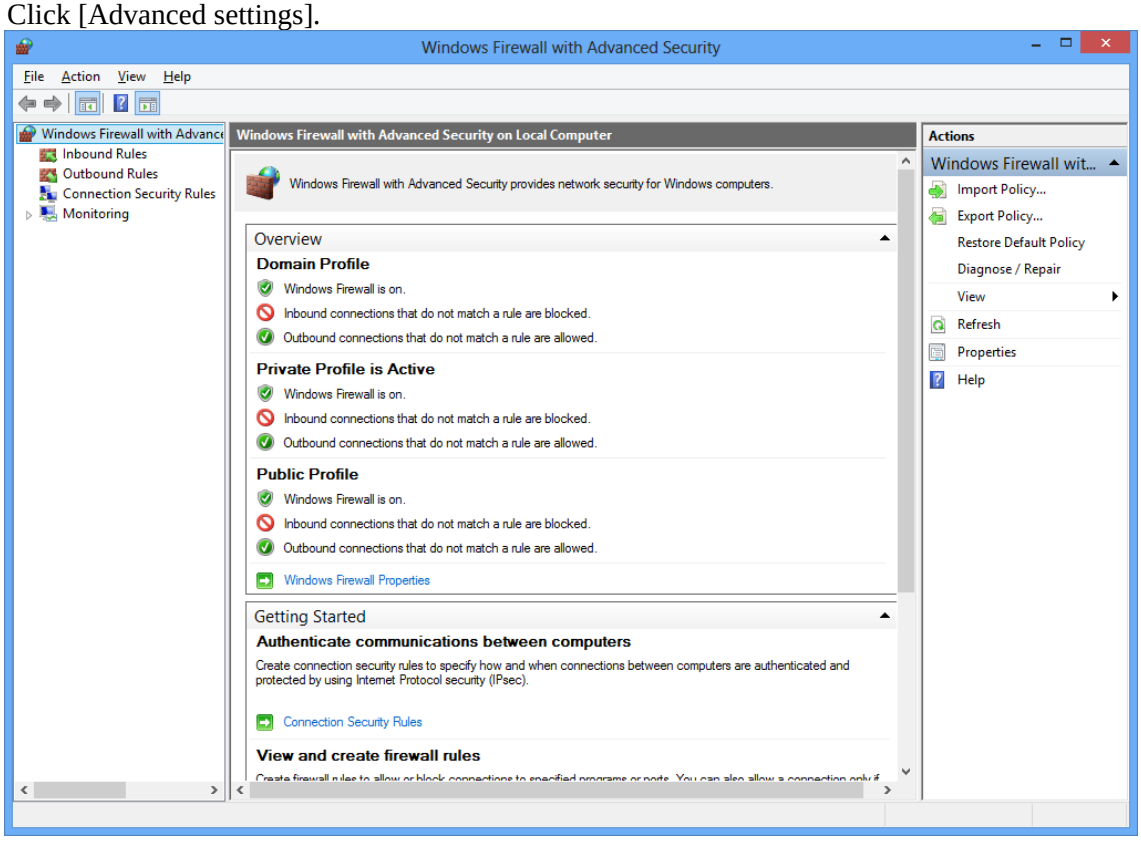


5 Click [OK] and close [Allowed applications].

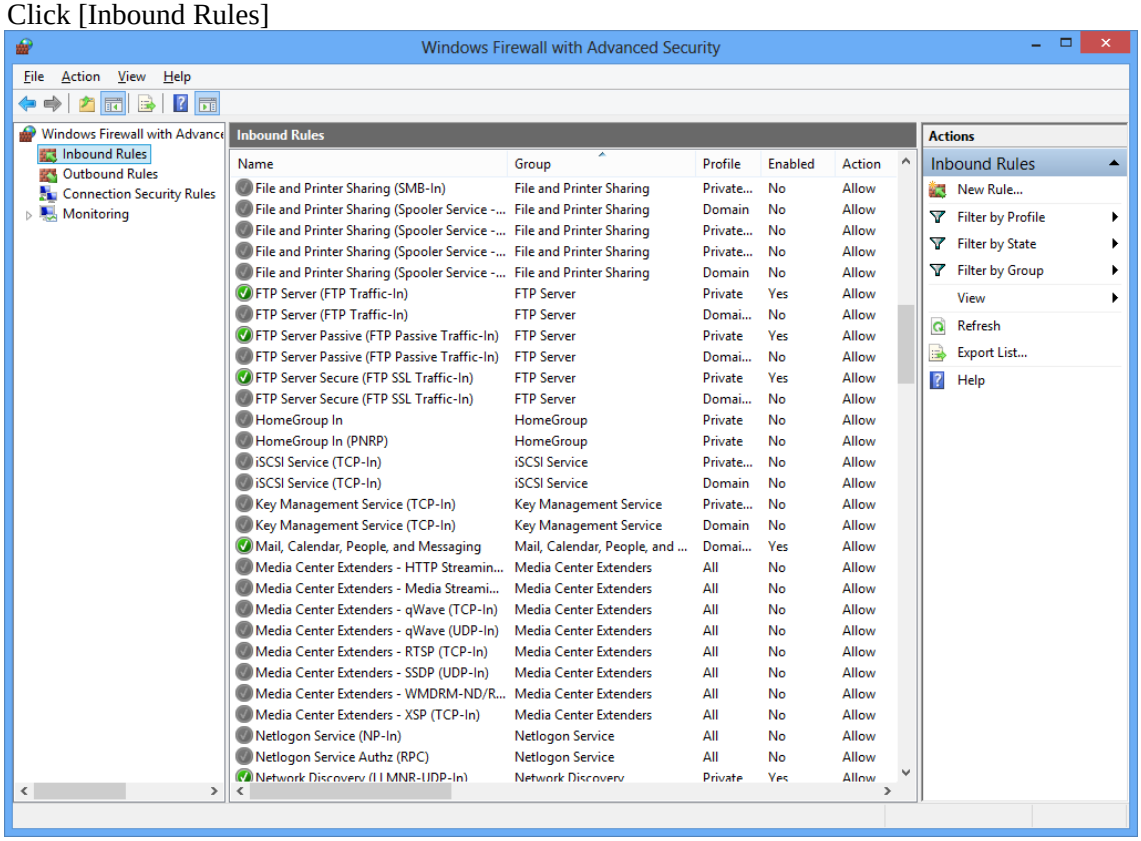
6 Return to [System and Security], then click [Windows Firewall].



7 Click [Advanced settings].



8 Click [Inbound Rules]



9 Check if [FTP Server Passive (FTP Passive Traffic-In)], [FTP Server (FTP Traffic-In)], and [File and Printer Sharing (Echo Request - ICMPv4-In)] are enabled. If those rules are not enable, select them and click [Enable Rule] in right pane. There are same name rule in [Inbound Rules], but their targets are different network location. The choice of rule to change enabled depend on rule's [Profile] and network location types. You can check the network location type according to the procedure described in "Checking the Windows 8 network" above.

C EXAMPLE OF SETTING UP DNS/DHCP

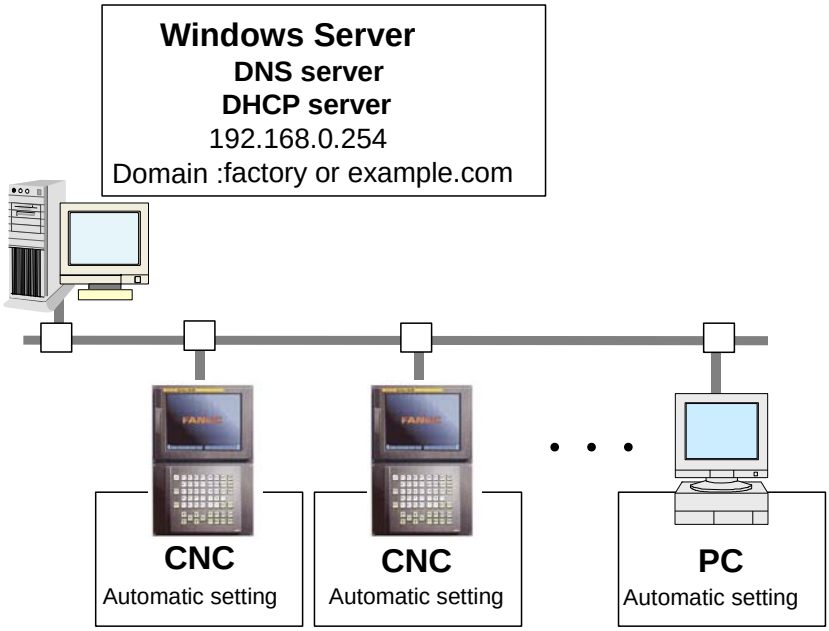
This appendix describes the method of setting up the DNS/DHCP server of Windows 2000 Server and Windows Server 2012.

NOTE
This appendix provides just examples of setup using Windows 2000 Server and Windows Server 2012. To use the DNS/DHCP server in an actual factory network, consult with the network administrator of the factory and make settings according to the actual network environment.

Example of setting a simple network

An example of setup in a network configuration that satisfies the following conditions is provided:

1. The DHCP server and DNS server are operated using the same personal computer.
2. The IP address of the DHCP server and DNS server is 192.168.0.254.
3. The DHCP server controls the IP address range 192.168.0.10 to 192.168.0.29.
4. The domain controlled by the DNS server is named "factory" or "example.com".
5. The same domain includes the DHCP server, DNS server, CNCs, and a PC for FOCAS1/Ethernet applications.



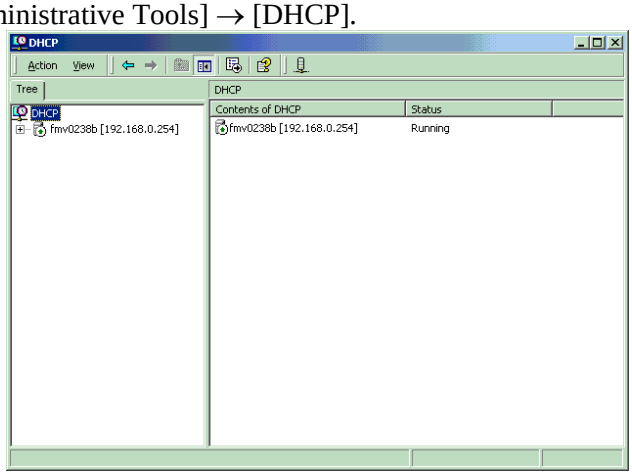
Example of network configuration

NOTE
The setting described above is just an example. For setup in an actual network configuration in the factory, consult with the network administrator of the factory.

C.1 EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server

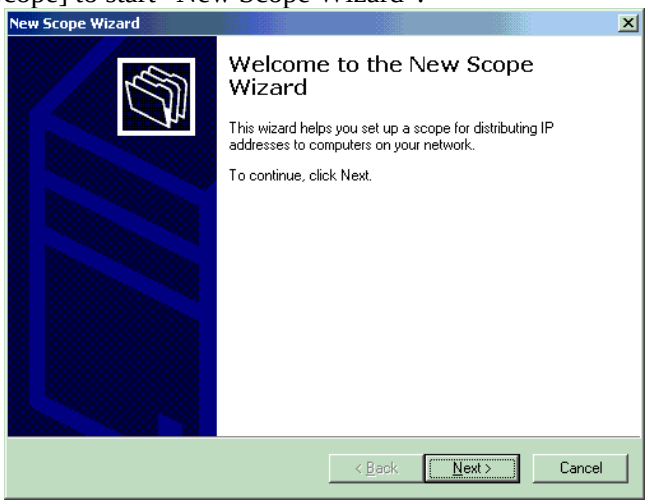
Activating the Microsoft administrative console (DHCP)

Click [Programs] → [Administrative Tools] → [DHCP].



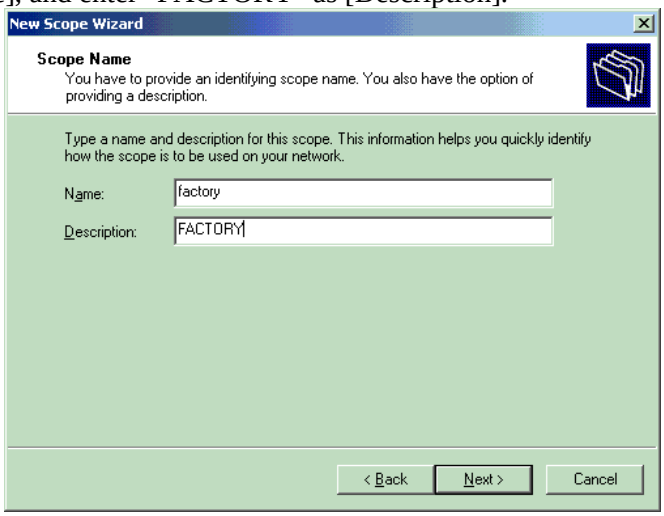
Adding a scope

Click [Action] → [New Scope] to start “New Scope Wizard”.



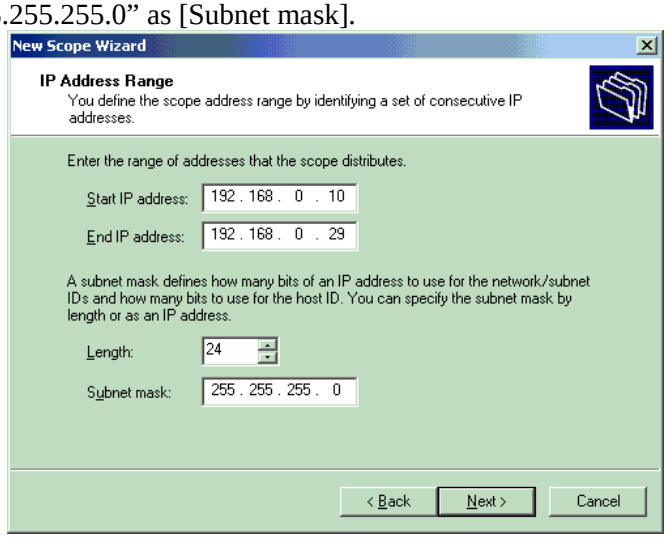
Click the [Next] button.

Enter "factory" as [Name], and enter "FACTORY" as [Description].

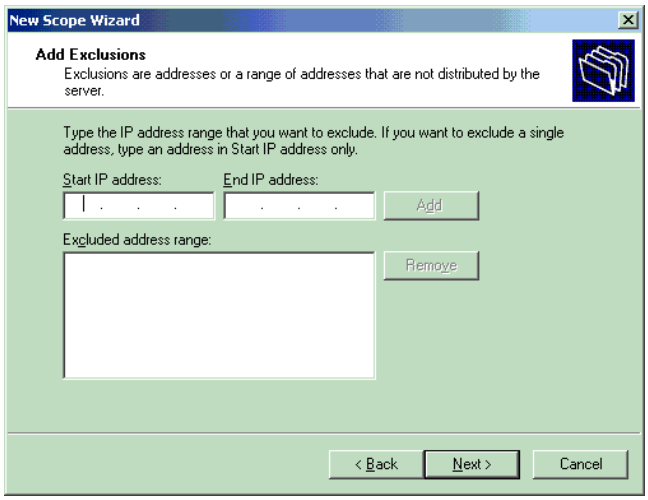


Click the [Next] button.

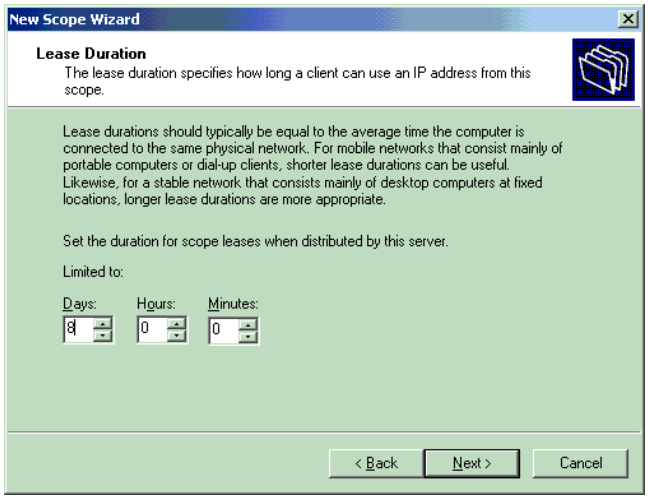
Enter “192.168.0.10” as [Start IP address], enter “192.168.0.29” as [End IP address], enter “24” as [Length], and enter “255.255.255.0” as [Subnet mask].



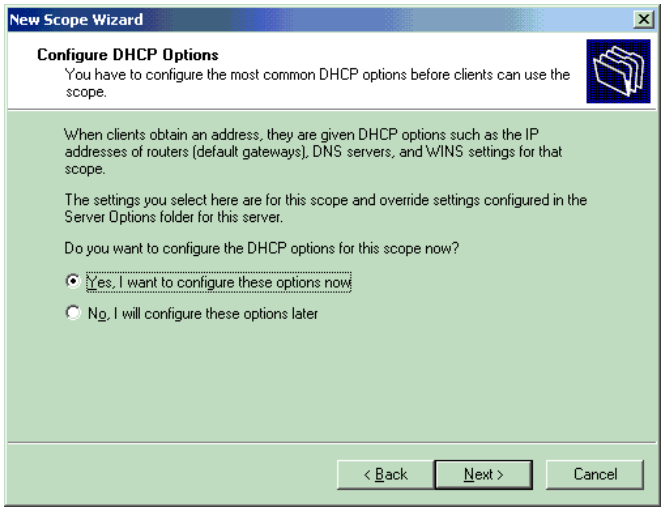
Click the [Next] button.



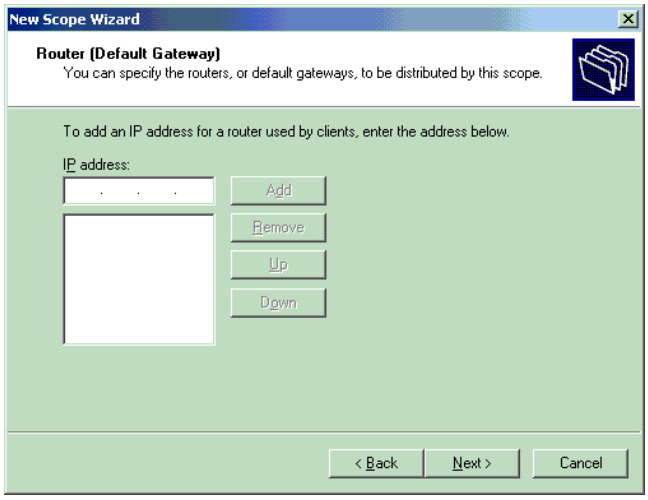
Click the [Next] button without entering any data.



Keep "8" days unchanged as Period, then click the [Next] button.

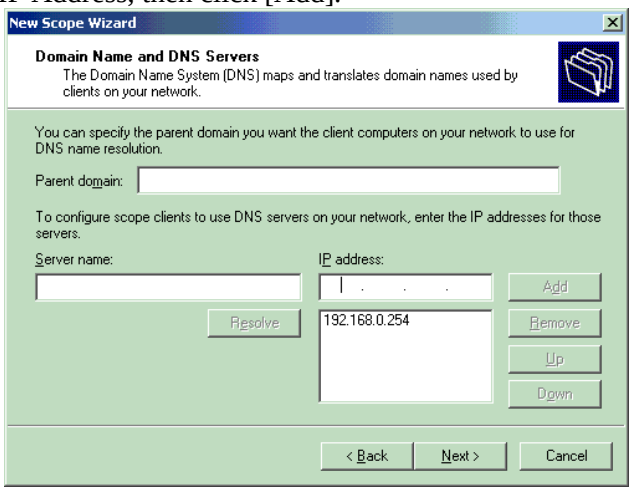


Keep [Yes, I want to configure these options now] selected, and click the [Next] button.

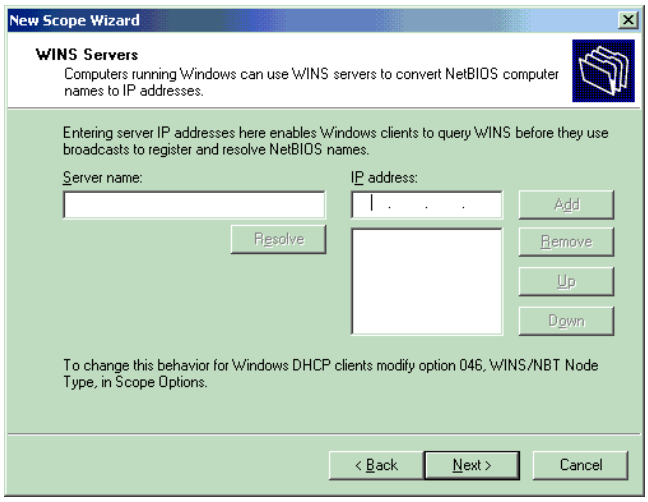


Click the [Next] button without entering any data.

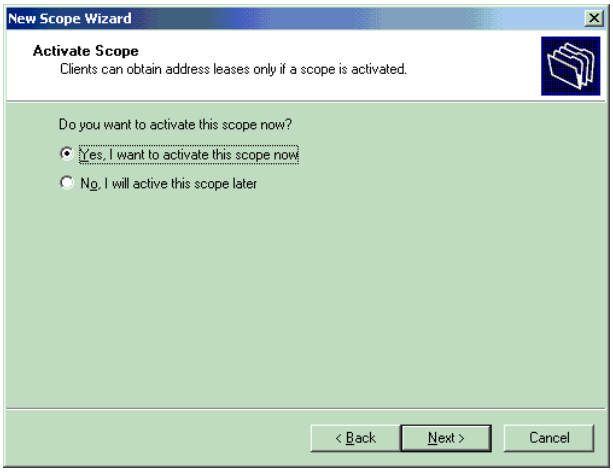
Enter “192.168.0.254” as IP Address, then click [Add].



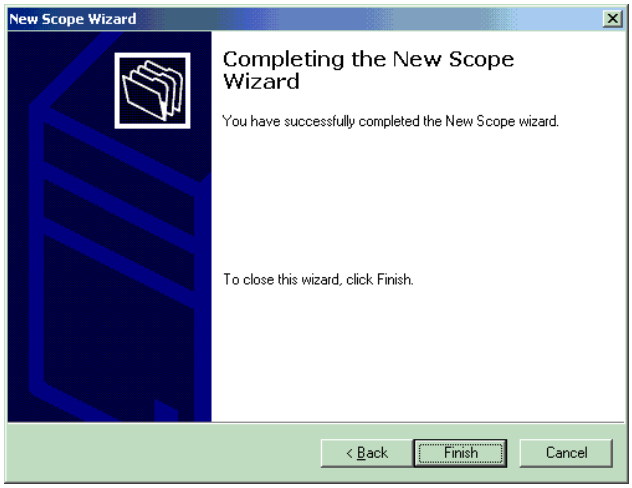
Click the [Next] button.



Click the [Next] button without entering any data.



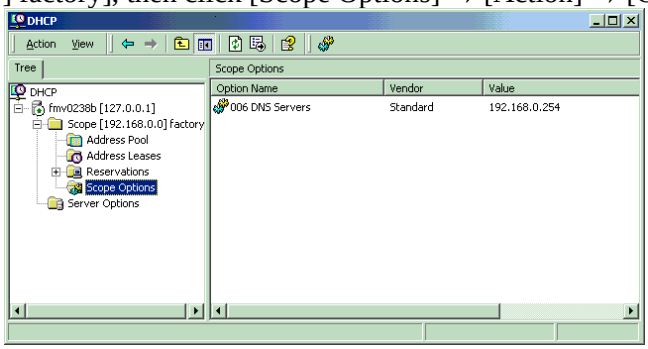
Keep [Yes, I want to activate this scope now] selected, and click the [Next] button.



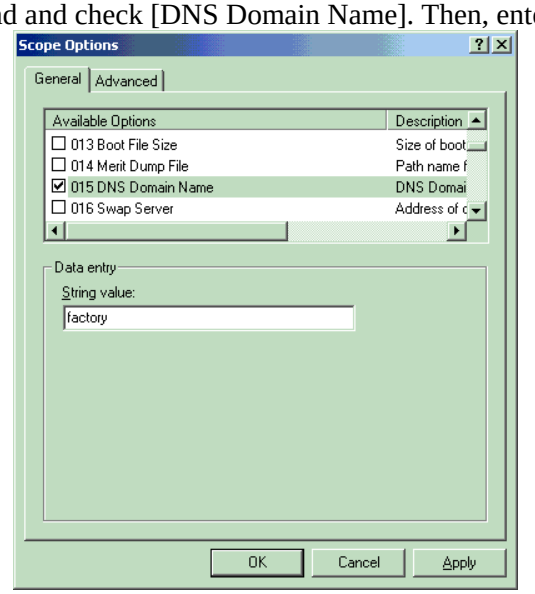
Click [Finish].

Adding a scope option

Click [Scope[192.168.0.0] factory], then click [Scope Options] → [Action] → [Configure Options].

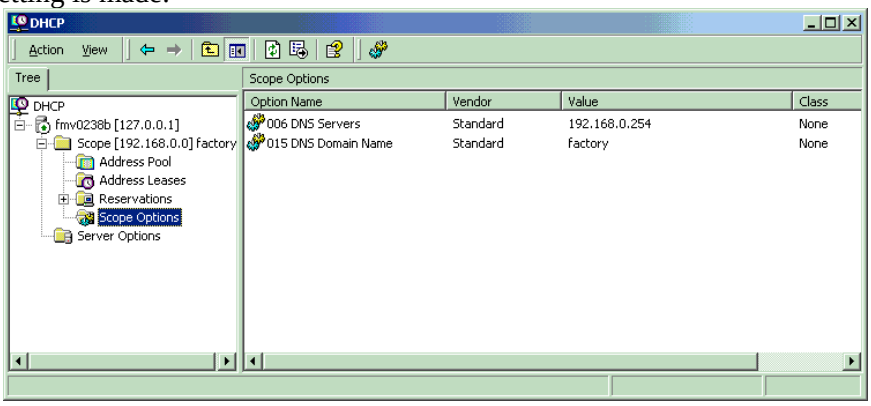


From the available options, find and check [DNS Domain Name]. Then, enter "factory" as String value.



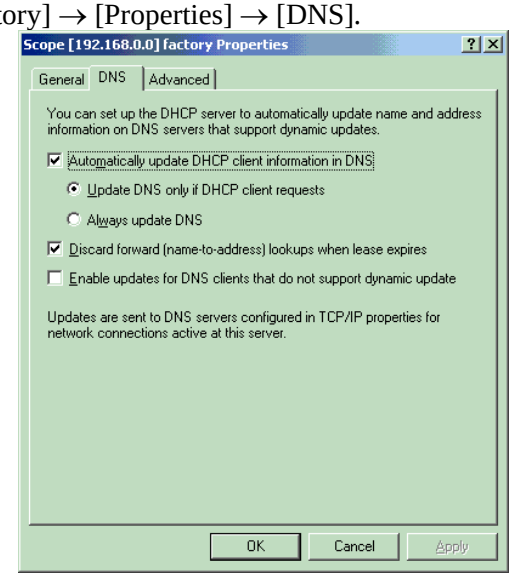
Click the [OK] button.

The following setting is made:

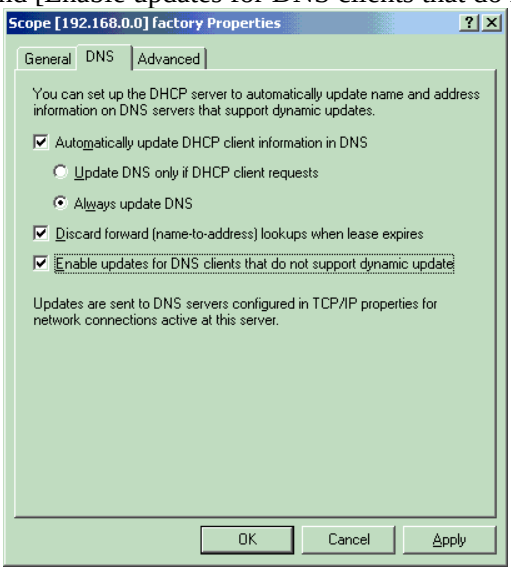


Enabling Dynamic DNS

Click [Scope[192.168.0.0] factory] → [Properties] → [DNS].



Check [Always update DNC] and [Enable updates for DNS clients that do not support dynamic update].



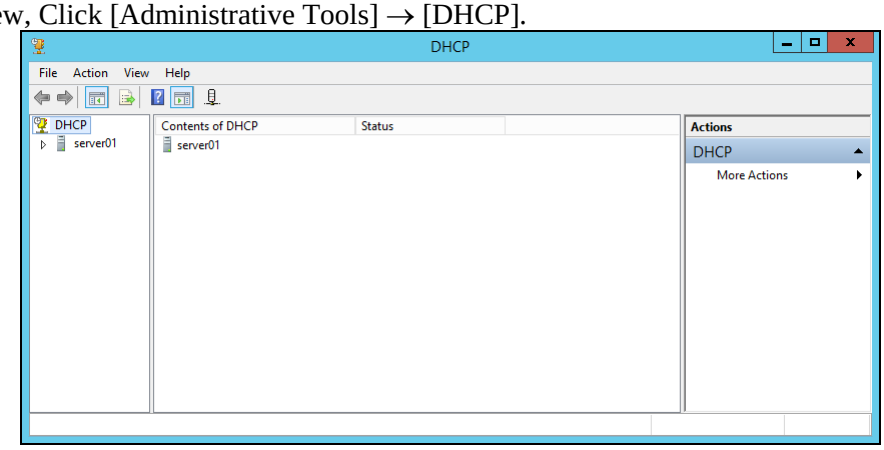
Click the [OK] button.

This completes DHCP server setting.

C.2 EXAMPLE OF SETTING UP DHCP SERVER OF Windows Server 2012

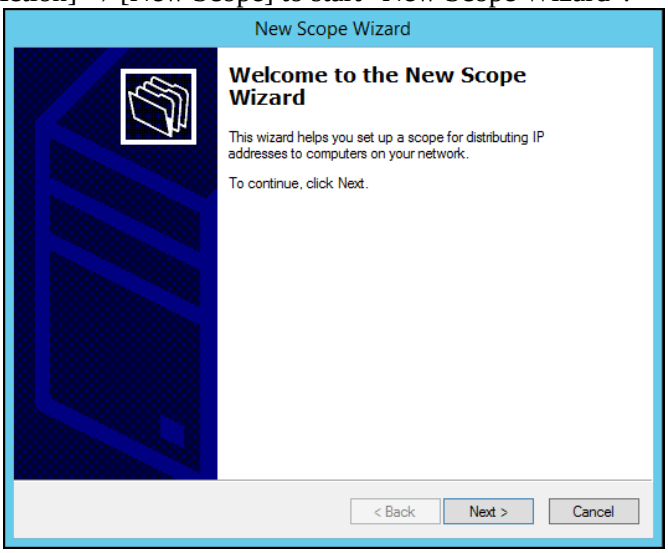
Activating the Microsoft administrative console (DHCP)

Open Apps view, Click [Administrative Tools] → [DHCP].



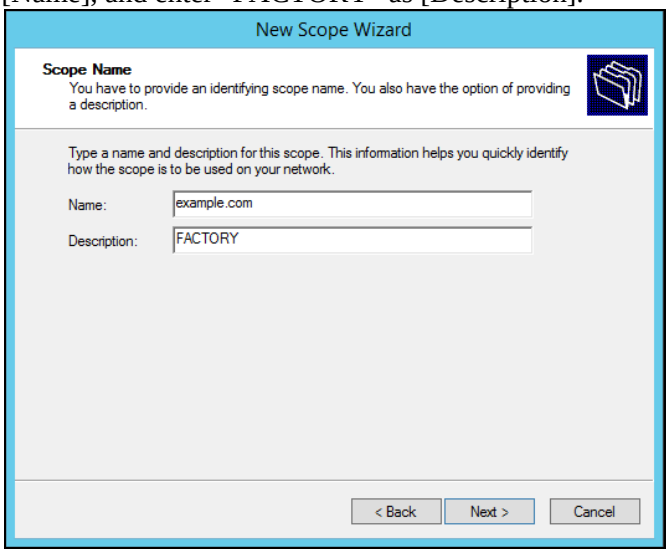
Adding a scope

Click[IPv4],then click [Action] → [New Scope] to start “New Scope Wizard”.



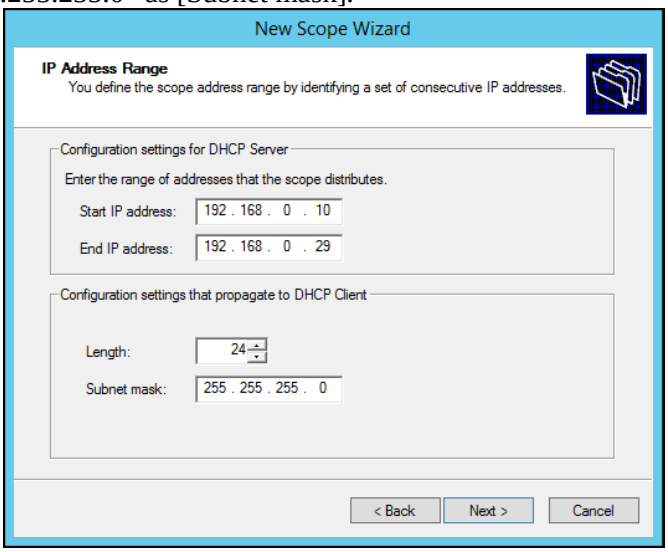
Click the [Next] button.

Enter "example.com" as [Name], and enter "FACTORY" as [Description].

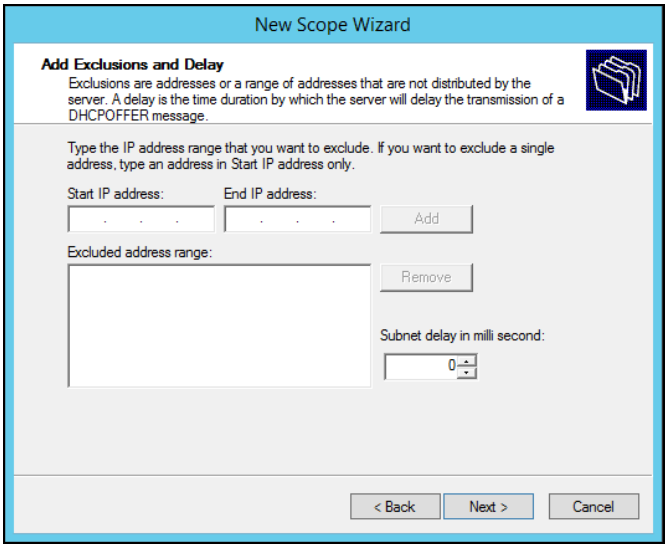


Click the [Next] button.

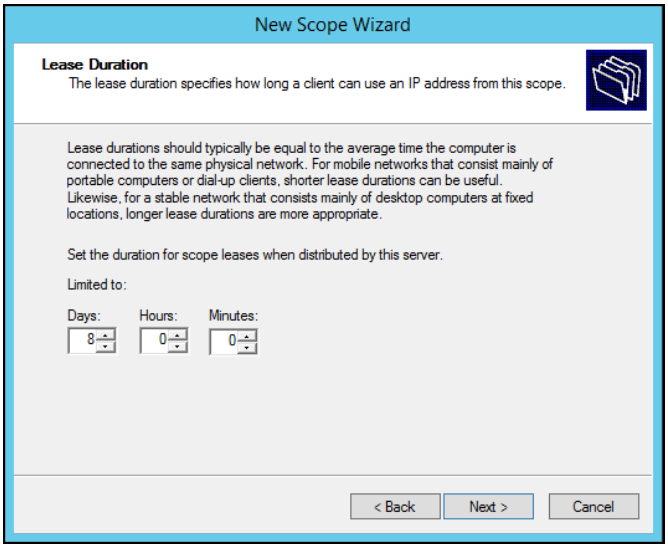
Enter “192.168.0.10” as [Start IP address], enter “192.168.0.29” as [End IP address], enter “24” as [Length], and enter “255.255.255.0” as [Subnet mask].



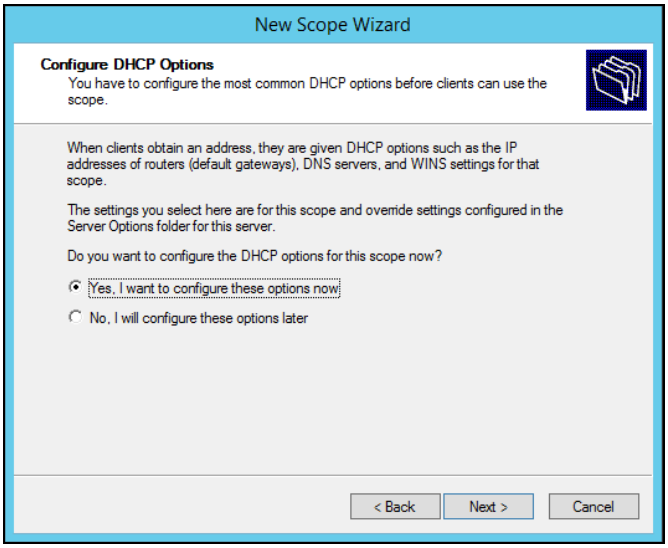
Click the [Next] button.



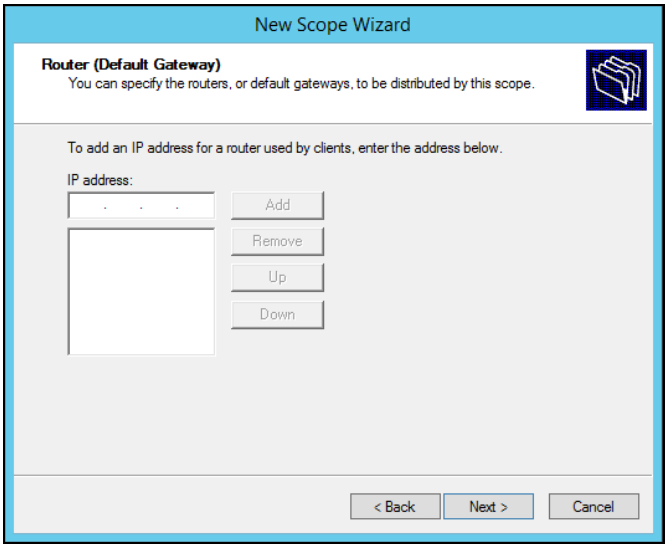
Click the [Next] button without entering any data.



Keep "8" days unchanged as Period, then click the [Next] button.

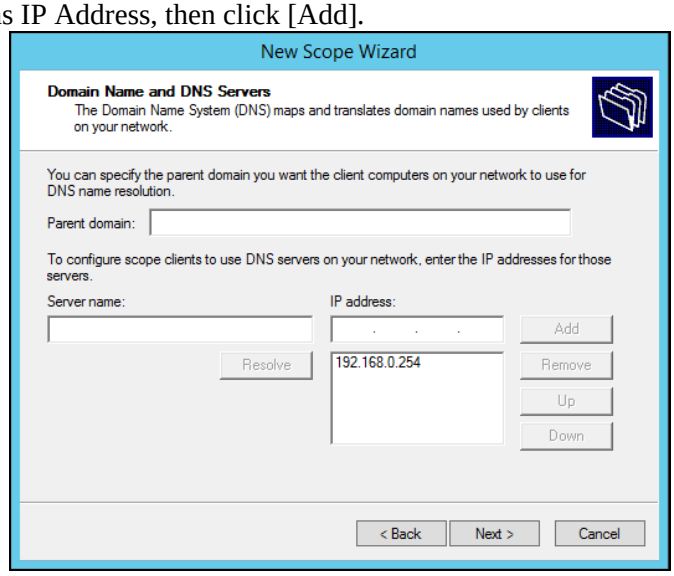


Keep [Yes, I want to configure these options now] selected, and click the [Next] button.

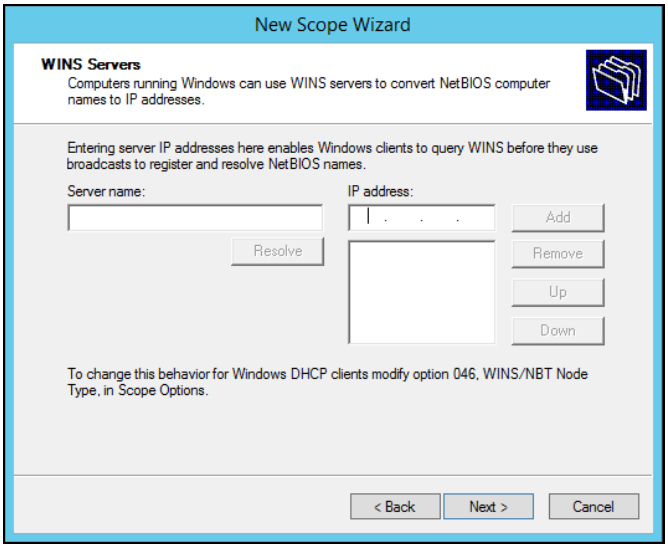


Click the [Next] button without entering any data.

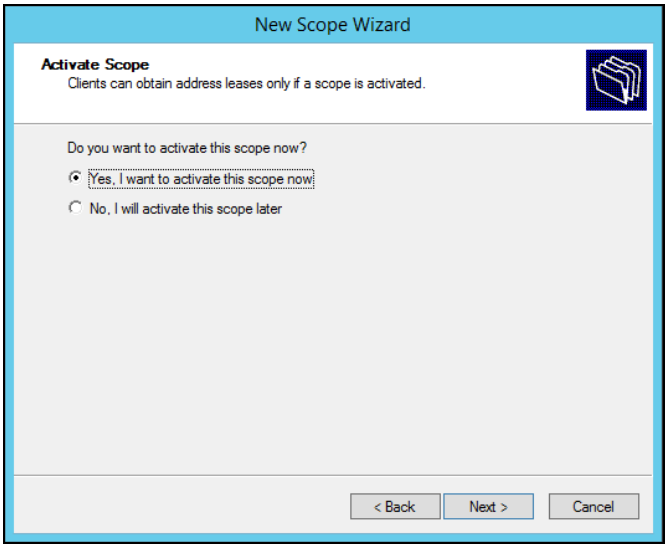
Enter “192.168.0.254” as IP Address, then click [Add].



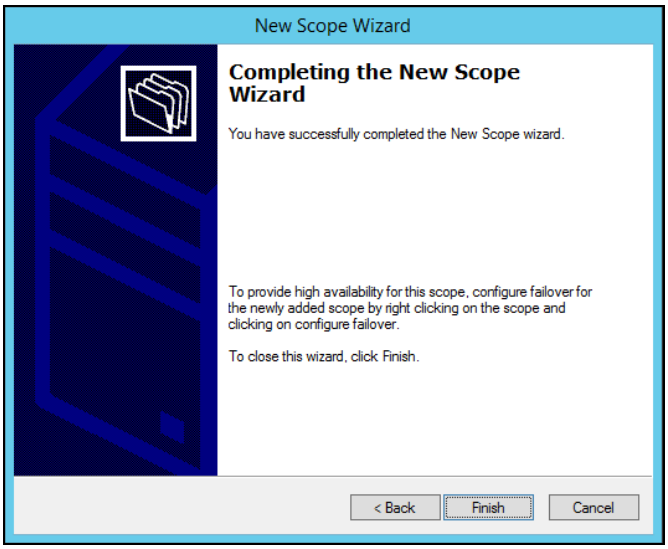
Click the [Next] button.



Click the [Next] button without entering any data.



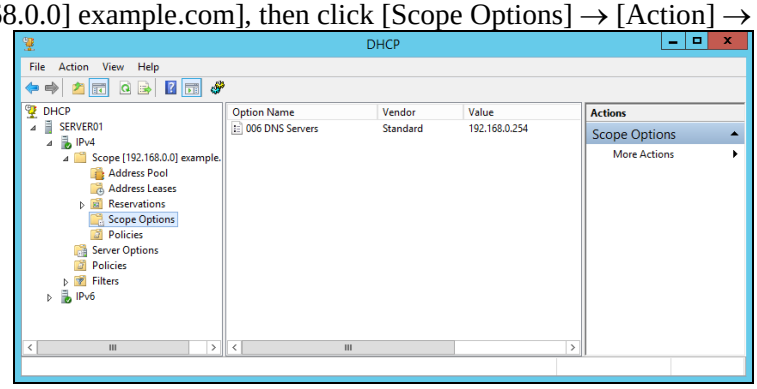
Keep [Yes, I want to activate this scope now] selected, and click the [Next] button.



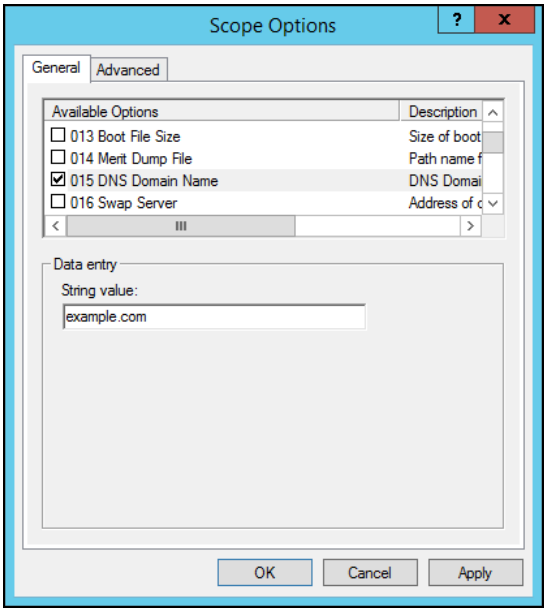
Click [Finish].

Adding a scope option

Click [Scope[192.168.0.0] example.com], then click [Scope Options] → [Action] → [Configure Options].

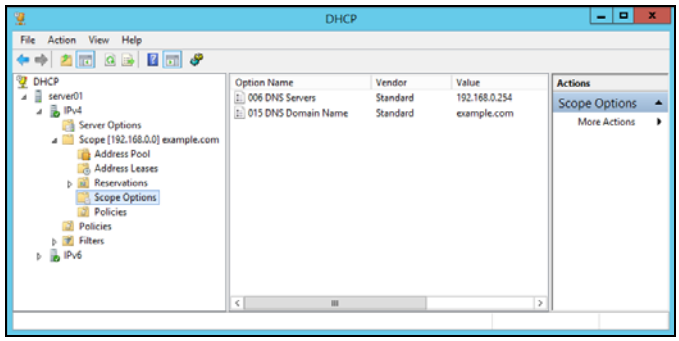


From the available options, find and check [DNS Domain Name]. Then, enter "example.com" as String value.



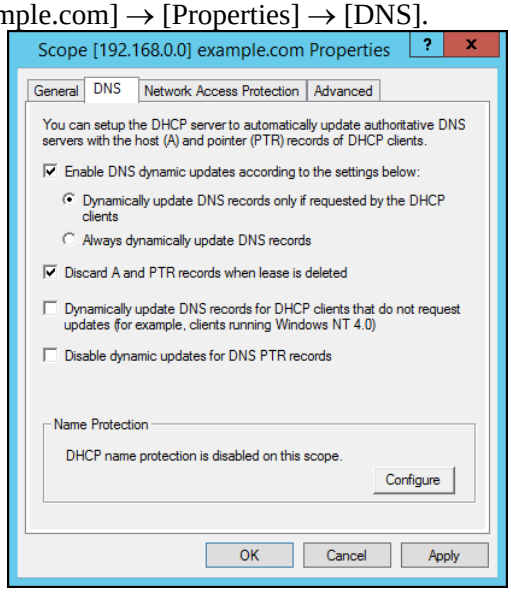
Click the [OK] button.

The following setting is made:

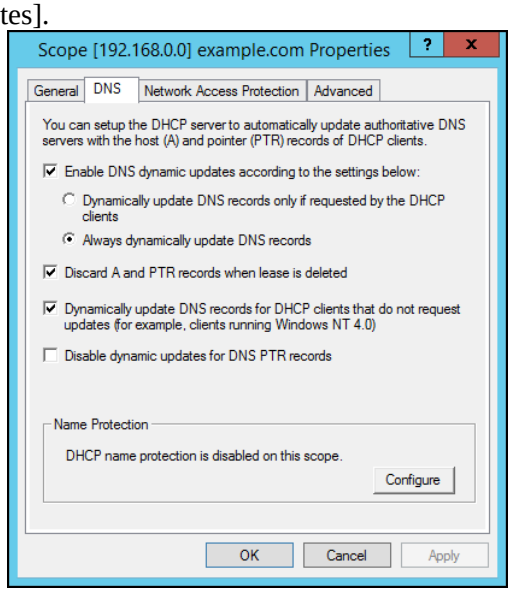


Enabling Dynamic DNS

Click [Scope[192.168.0.0] example.com] → [Properties] → [DNS].



Check [Always dynamically update DNC records] and [Dynamically update DNS records for DHCP clients that do not request updates].



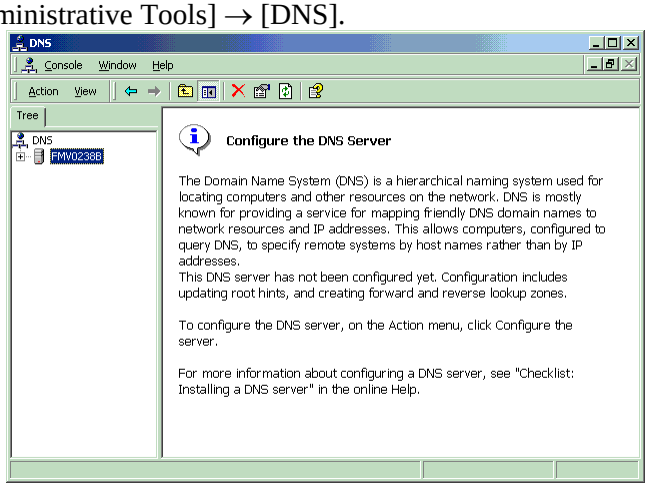
Click the [OK] button.

This completes DHCP server setting.

C.3 EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server

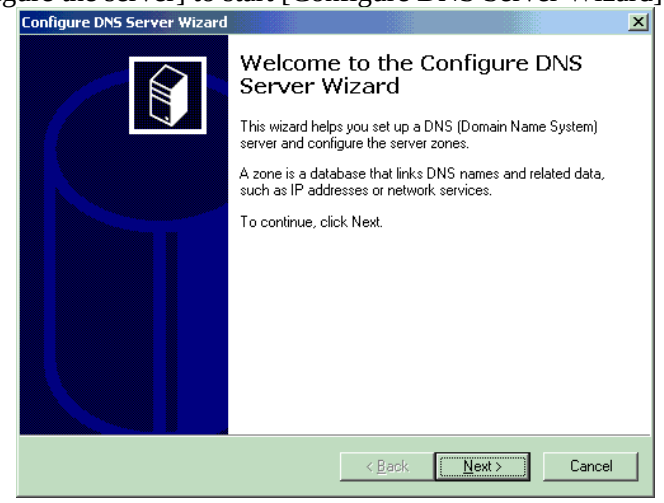
Activating the Microsoft administrative console (DNS)

Click [Programs] → [Administrative Tools] → [DNS].

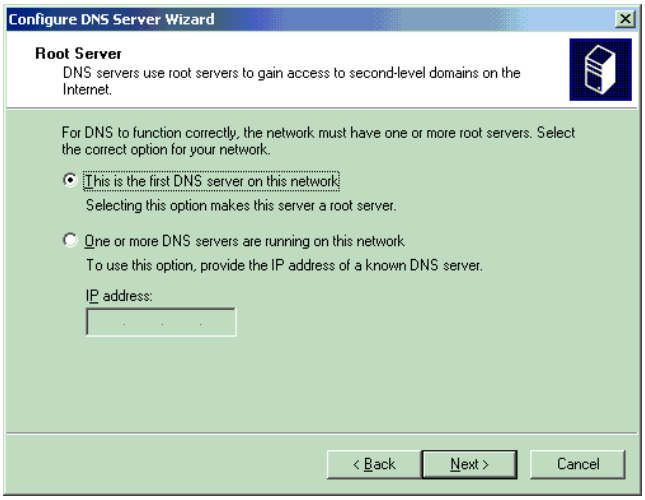


DNS server configuration

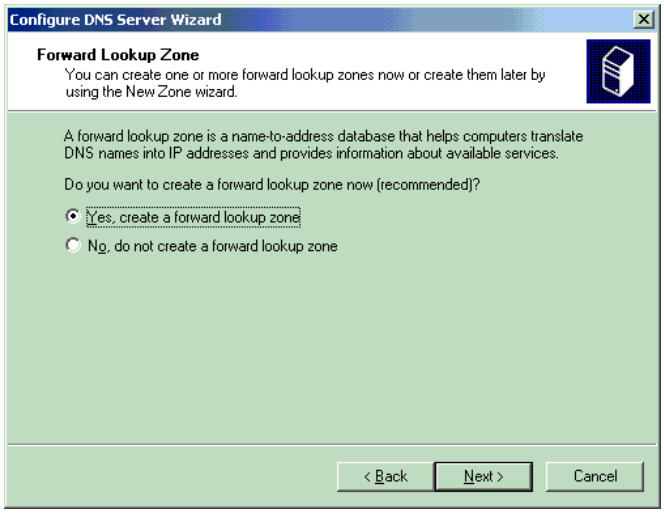
Click [Action] → [Configure the server] to start [Configure DNS Server Wizard].



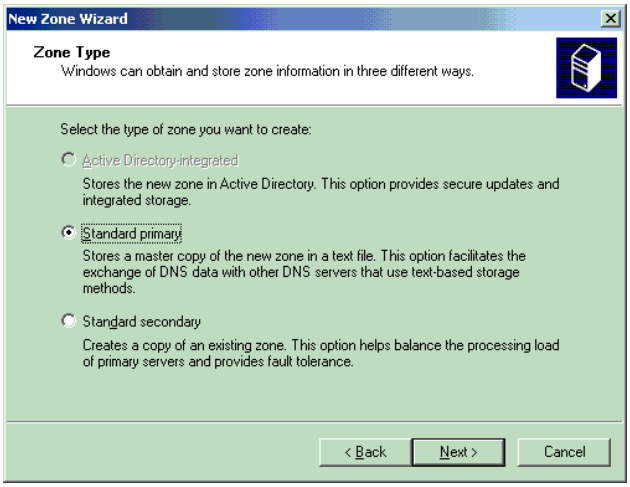
Click the [Next] button.



Keep [This is the first DNS server on this network] selected, and click the [Next] button.

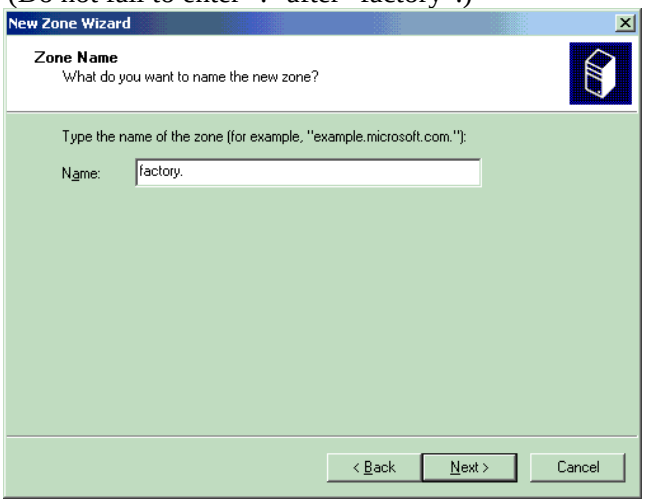


Keep [Yes, create a forward lookup zone], and click the [Next] button.

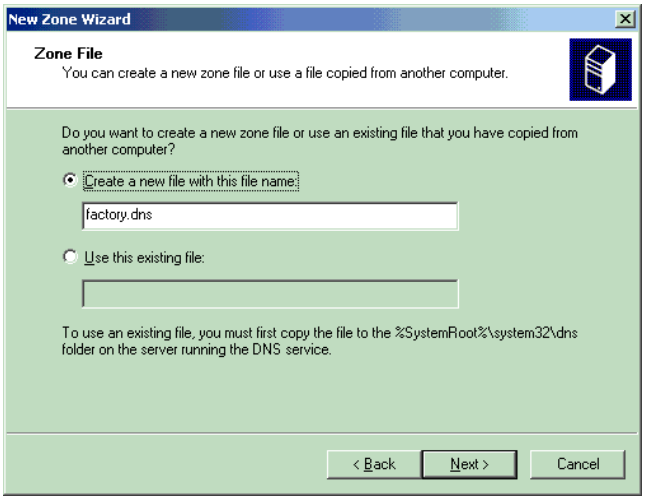


Keep [Standard primary] selected, and click the [Next] button.

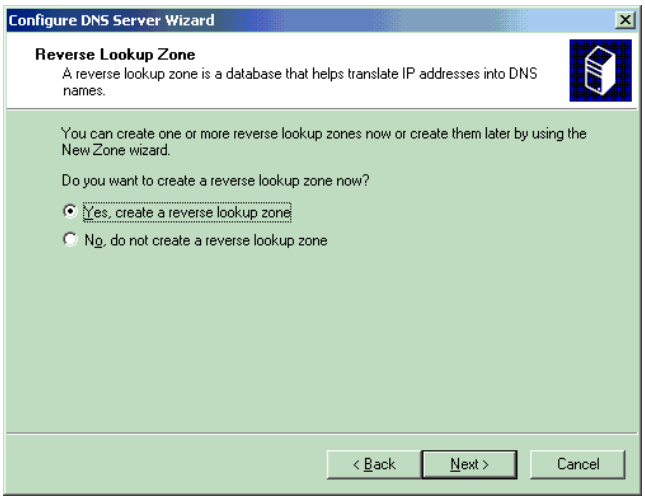
Enter "factory." as Name. (Do not fail to enter "." after "factory".)



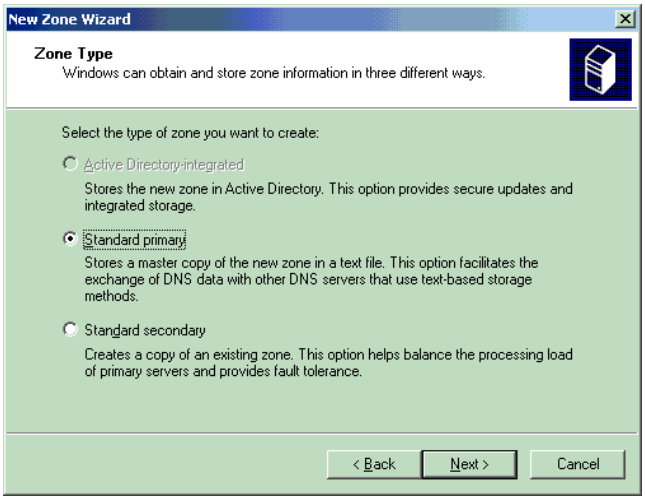
Click the [Next] button.



Keep “factory.dns” unchanged, and click the [Next] button.

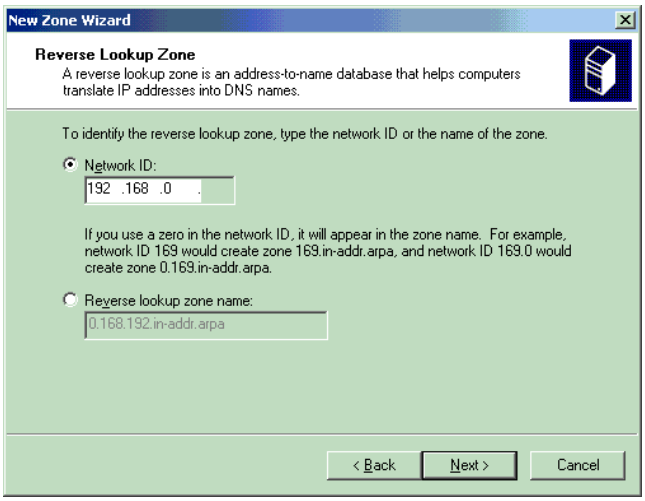


Keep [Yes, create a reverse lookup zone] selected, and click the [Next] button.

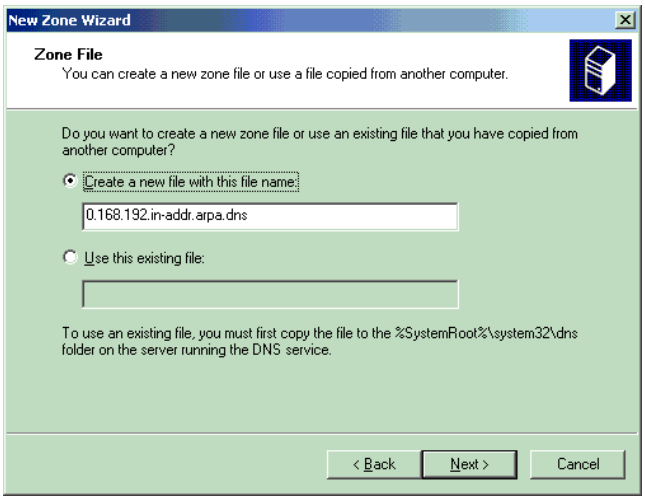


Keep [Standard primary] selected, and click the [Next] button.

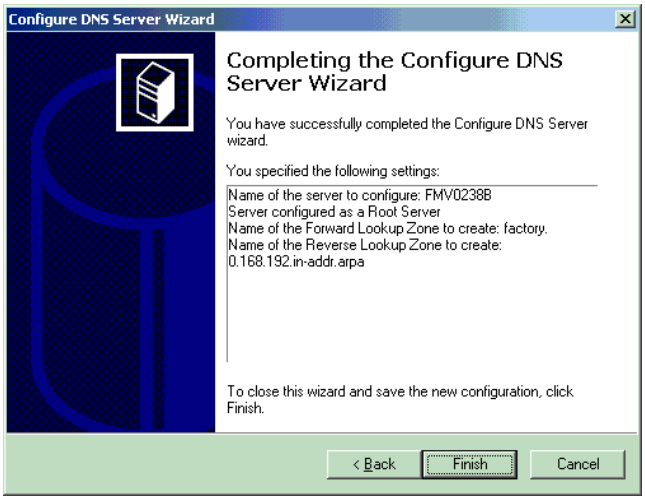
Enter “192.168.0” as Network ID.



Click the [Next] button.



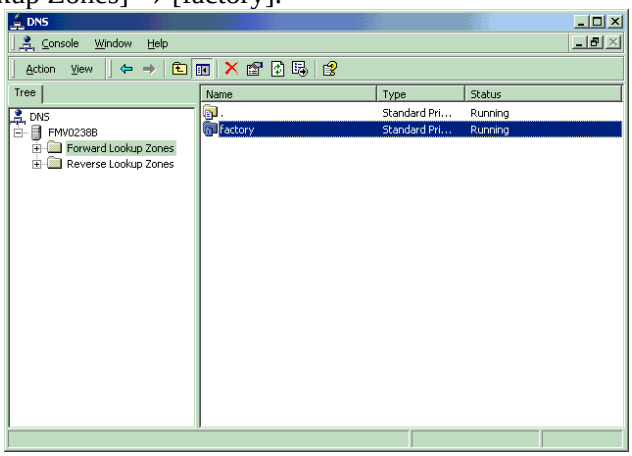
Keep “0.168.192.in-addr.arpa.dns” unchanged, and click the [Next] button.



Click the [Finish] button.

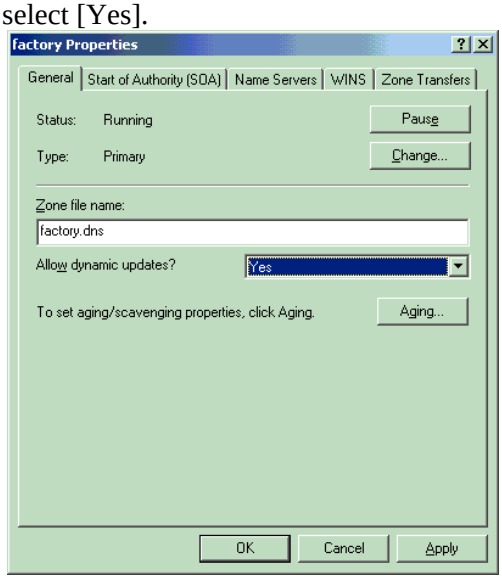
Enabling Dynamic DNS

Right-click [Forward Lookup Zones] → [factory].



Click [Properties].

For [Allow dynamic updates?], select [Yes].



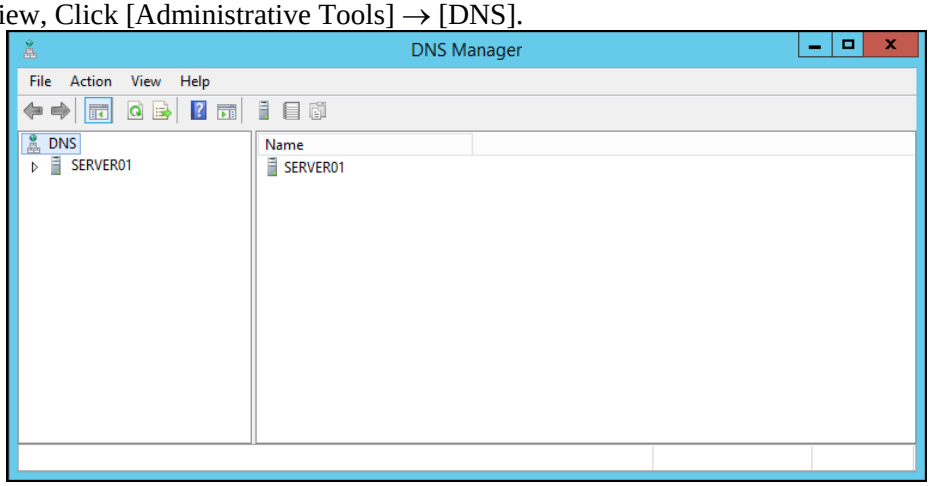
Click the [OK] button.

This completes DNS server setting.

C.4 EXAMPLE OF SETTING UP DNS SERVER OF Windows Server 2012

Activating the Microsoft administrative console (DNS)

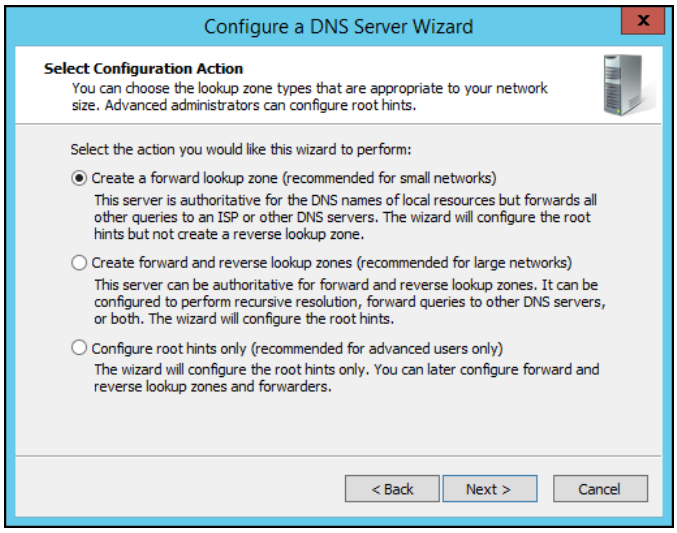
Open Apps view, Click [Administrative Tools] → [DNS].



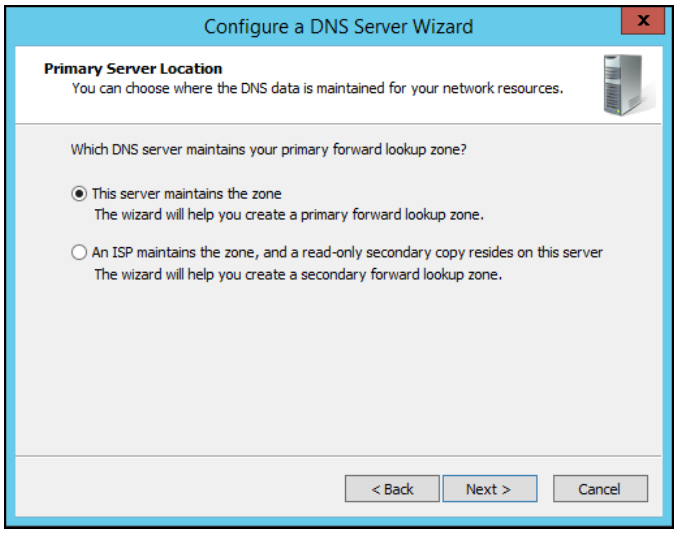
DNS server configuration

Click [Action] → [Configure the server] to start [Configure DNS Server Wizard].

Click the [Next] button.

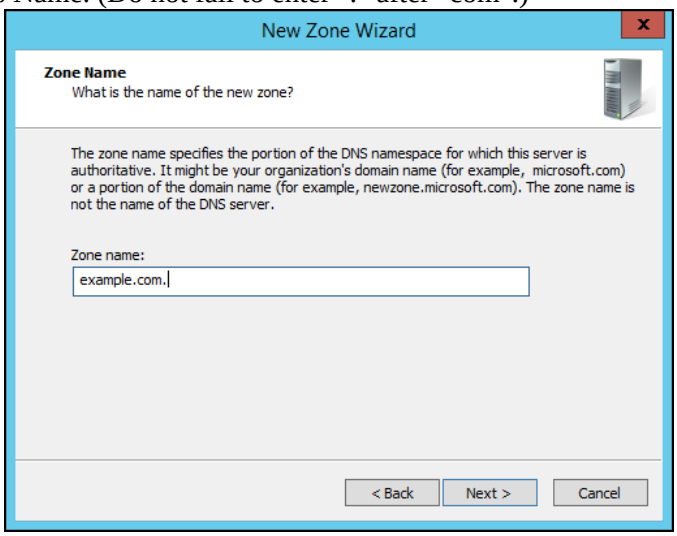


Keep [Create a forward lookup zone (recommended for small networks)]selected , and click the [Next] button.

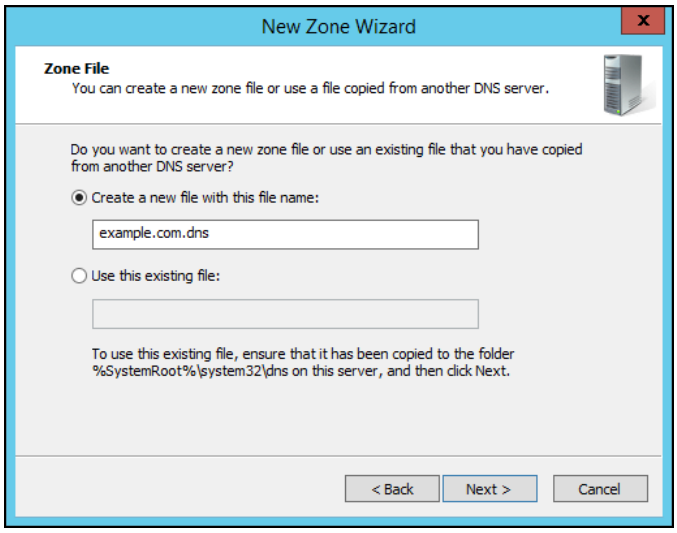


Keep [This server maintains the zone] selected, and click the [Next] button.

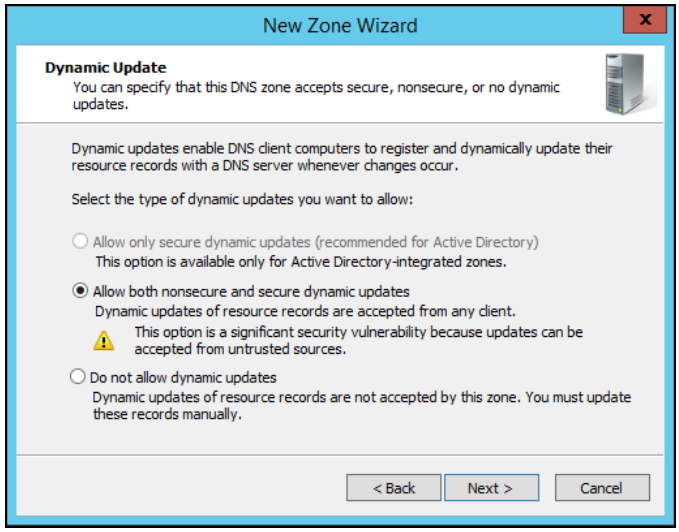
Enter "example.com." as Name. (Do not fail to enter "." after "com".)



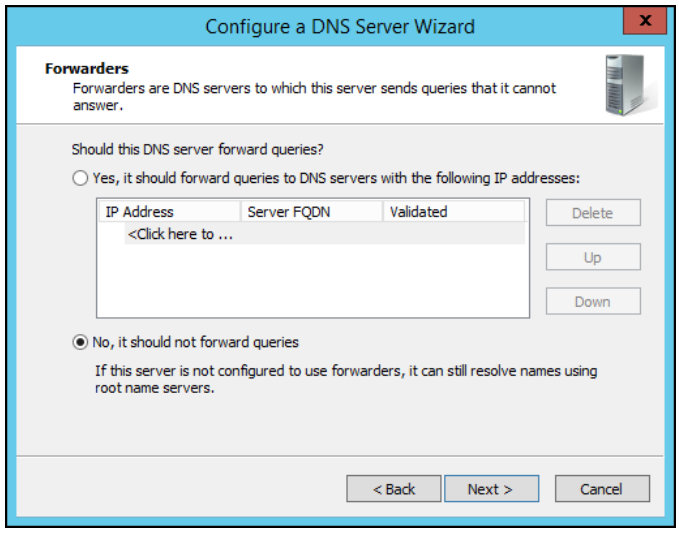
Click the [Next] button.



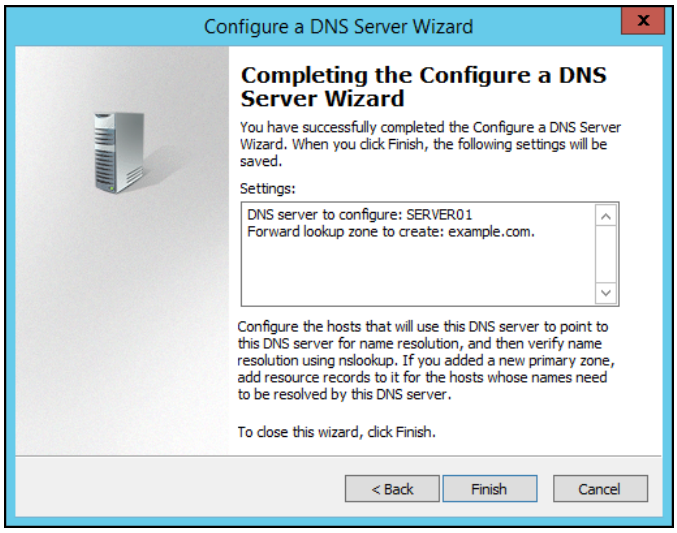
Keep “example.com.dns” unchanged, and click the [Next] button.



Select[Allow both nonsecure and secure dynamic updates], and click the [Next] button.



Select [No, it should not forward queries], and click the [Next] button.



Click the [Finish] button.

This completes DNS server setting.

D FTP CLIENT OPERATION

This appendix describes the method of operating an FTP client that operates on the host computer to function as a communication destination for the Data Server functions.

D.1 OPERATION USING THE FTP COMMAND

Login

1 Enter "ftp IP-address-of-NC or host-name" at the command prompt.
2 Enter a user name.
3 Enter a password.
4 The message, "230 User logged in, proceed." indicates that the login process has been completed successfully.

```
Command Prompt - ftp 192.168.0.1
Microsoft(R) Windows NT(R)
(C) Copyright 1985-1996 Microsoft Corp.

F:¥>ftp 192.168.0.1
Connected to 192.168.0.1.
220 FANUC FTP server ready.
User (192.168.0.1:(none)): dtsvr
331 User name okay, need password.
Password:
230 User logged in, proceed.
ftp>
```

GET (acquiring a file from the FTP server)

1 Enter "get hard-disk-file-name."

```
ftp> get O0001.DAT
200 Command okay.
150 Opening data connection for (O0001.DAT) (192.168.0.101,1036).
226 Closing data connection.
1040102 bytes received in 13.28 seconds (78.33 Kbytes/sec)
ftp>
```

MGET (acquiring files from the FTP server)

1 Enter "mget hard-disk-file-name (including a wildcard character)."

```
ftp> mget *.DAT
200 Command okay.
200 Command okay.
150 Opening data connection for (O0002.DAT) (192.168.0.101,1066).
226 Closing data connection.
2080120 bytes received in 27.45 seconds (75.78 Kbytes/sec)
200 Command okay.
150 Opening data connection for (PRG7.DAT) (192.168.0.101,1067).
226 Closing data connection.
1160 bytes received in 0.13 seconds (8.92 Kbytes/sec)
ftp>
```

PUT (sending a file to the FTP server)

1 Enter "put host-file-name hard-disk-file-name."

```
ftp> put O0001.DAT O0001
200 Command okay.
150 Opening data connection for (O0001) (192.168.0.101,1037).
226 Closing data connection.
1040102 bytes sent in 11.48 seconds (90.63 Kbytes/sec)
ftp>
```

MPUT (sending files to the FTP server)

1 Enter "mput host-file-name (including a wildcard character)."

```
ftp> mput *.DAT
200 Command okay.
150 Opening data connection for (O0002.DAT) (192.168.0.101,1068).
226 Closing data connection.
2080120 bytes sent in 22.69 seconds (91.66 Kbytes/sec)
200 Command okay.
150 Opening data connection for (PRG7.DAT) (192.168.0.101,1069).
226 Closing data connection.
1160 bytes sent in 0.00 seconds (1160000.00 Kbytes/sec)
ftp>
```

DIR (acquiring a list of files of the FTP server)

1 Enter dir.

```
ftp> dir
200 Command okay.
150 Opening data connection for (LIST ) (192.168.0.101,1035).
d---------   1 owner    group              0 Feb 10 15:42 .
d---------   1 owner    group              0 Feb 10 15:42 ..
----------   1 owner    group        1040102 Feb 16 09:47 O0001.DAT
----------   1 owner    group        2080120 Feb 16 09:47 O0002.DAT
----------   1 owner    group          45448 Feb 24 16:57 PRAMETER
----------   1 owner    group          11092 Feb 24 17:02 TOOLOFS
----------   1 owner    group           4116 Feb 25 10:35 MACRO
----------   1 owner    group             74 Feb 16 09:47 O0199.PRG
----------   1 owner    group          12292 Feb 24 17:09 PITCH
----------   1 owner    group           2740 Feb 24 17:54 WORKOFS
----------   1 owner    group            462 Feb 24 20:28 HISTORY
----------   1 owner    group           6004 Feb 24 20:31 M-CODE
----------   1 owner    group           1160 Feb 16 09:48 PRG7.DAT
226 Closing data connection.
876 bytes received in 0.17 seconds (5.15 Kbytes/sec)
ftp>
```

DEL (deleting a file from the FTP server)

1 Enter "del hard-disk-file-name."

```
ftp> del O0001.DAT
250 Requested file action okay, completed.
ftp>
```

TYPE (confirming the transfer type of the FTP client)

1. Enter type.
2. Whether the ascii mode or binary mode is set can be determined.

```
ftp> type
Using ascii mode to transfer files.
ftp>
```

```
ftp> type
Using binary mode to transfer files.
ftp>
```

ASCII, BIN (changing the transfer type of the FTP client)

1. Entering bin can change the mode to the binary mode.

```
ftp> bin
200 Type set to I.
ftp>
```

2. Entering ascii can change the mode to the ascii mode.

```
ftp> ascii
200 Type set to A.
ftp>
```

Logout

1 Enter bye.

```
ftp> bye
221 Service closing control connection.

F:¥>
```

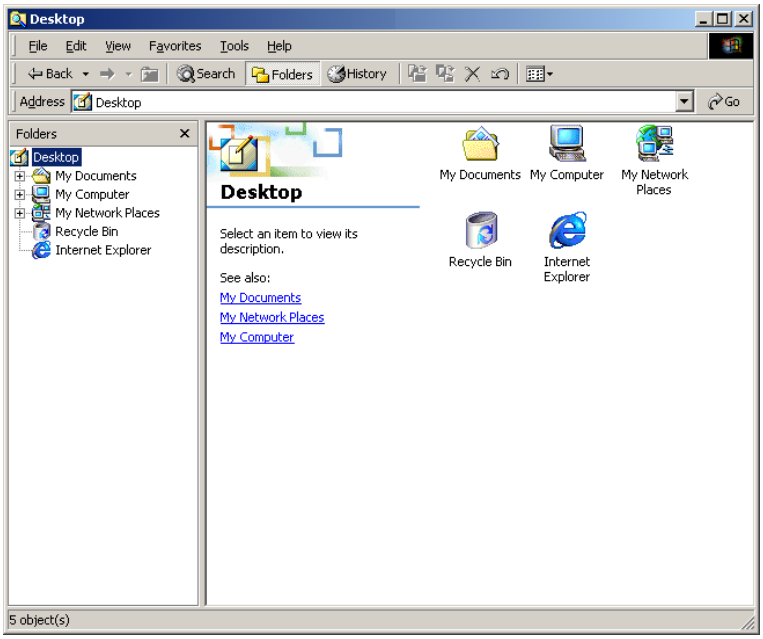
D.2 OPERATION USING THE Explorer

D.2.1 Displaying the File List

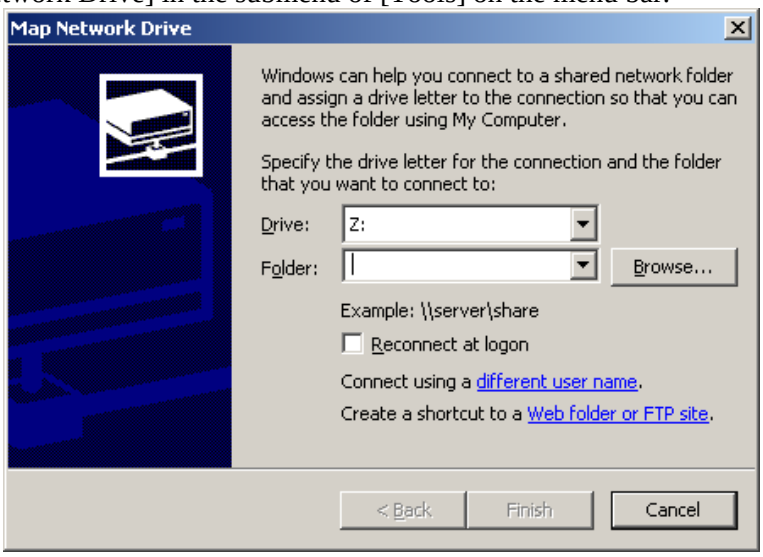
Windows Explorer can display the file list in Data Server by adding the network shortcut that connects to Data Server with FTP connection.
Display layout (such as Icon, List, or Detail etc.) of files in Data Server can be selected by standard operation of Windows Explorer.

Register Data Server as a Network Place (for Windows 2000 Professional)

1. Start an Explorer.

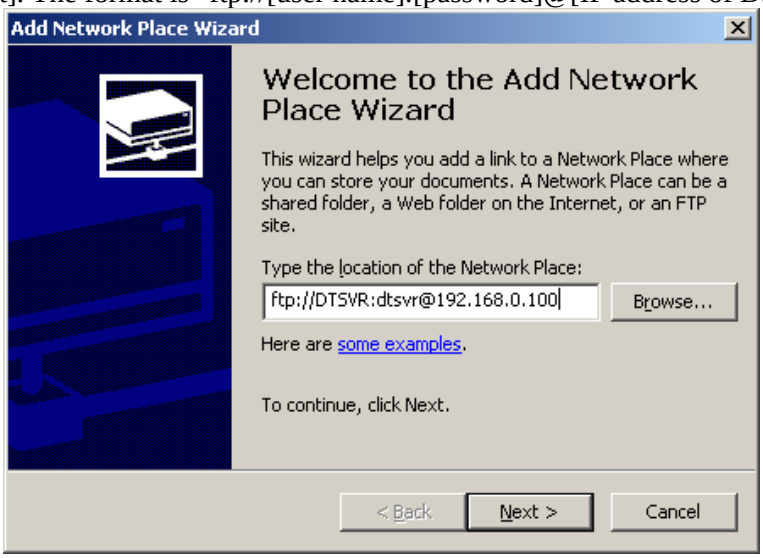


2. Select [Map Network Drive] in the submenu of [Tools] on the menu bar.

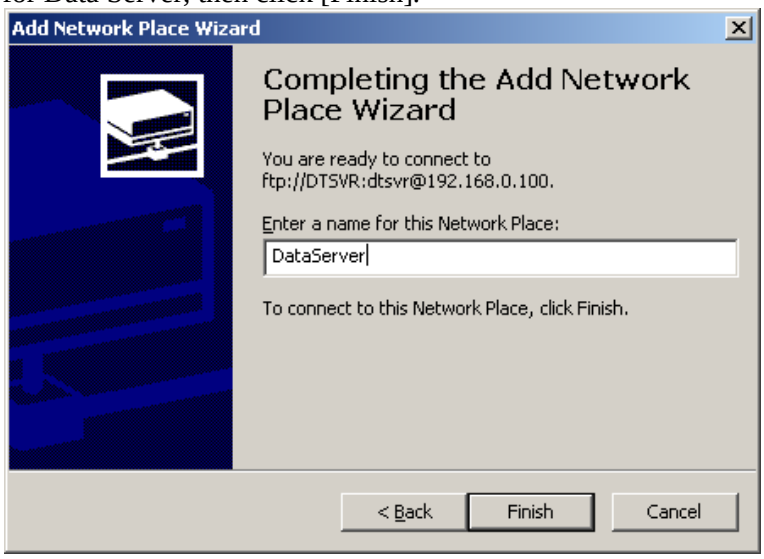


3. Click “Create a shortcut to a Web folder or FTP site.” to start “Add Network Place Wizard”.

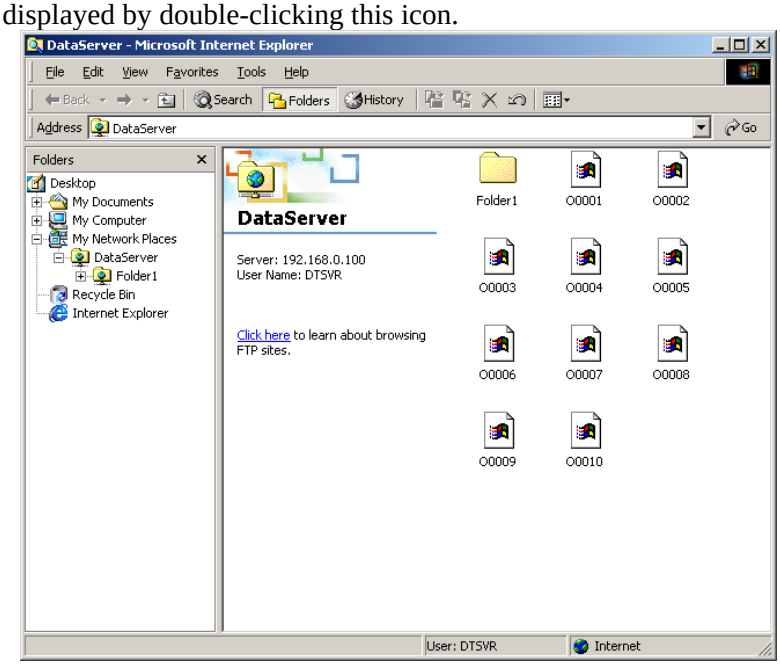
4. Input the user name, the password, and the IP address of Data Server for logging in to Data Server, then click [Next]. The format is “ftp://[user name]:[password]@[IP address of Data Server]”.



5. Input the name for Data Server, then click [Finish].

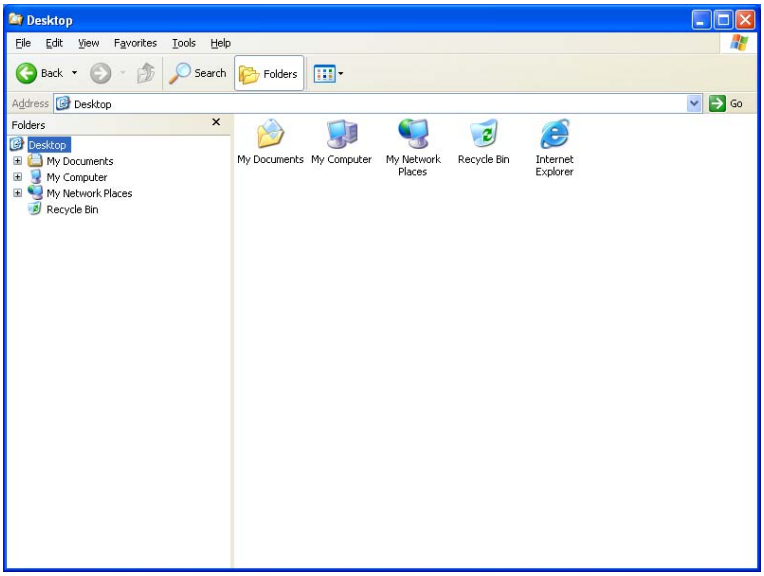


6. The file list in Data Server can be displayed by the Explorer.
The icon of Data Server is added in My Network Places. For the next time, the file list in Data Server can be displayed by double-clicking this icon.

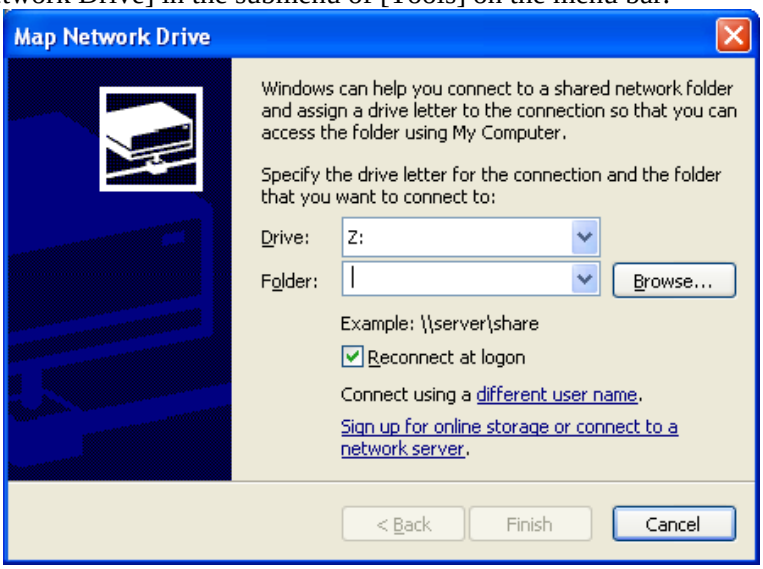


Register Data Server as a Network Place (for Windows XP Professional)

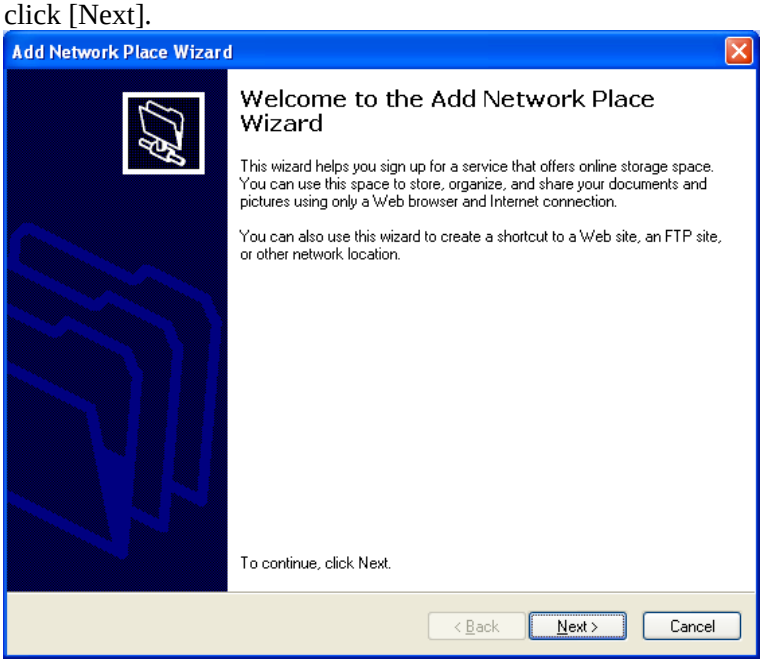
1. Start an Explorer.



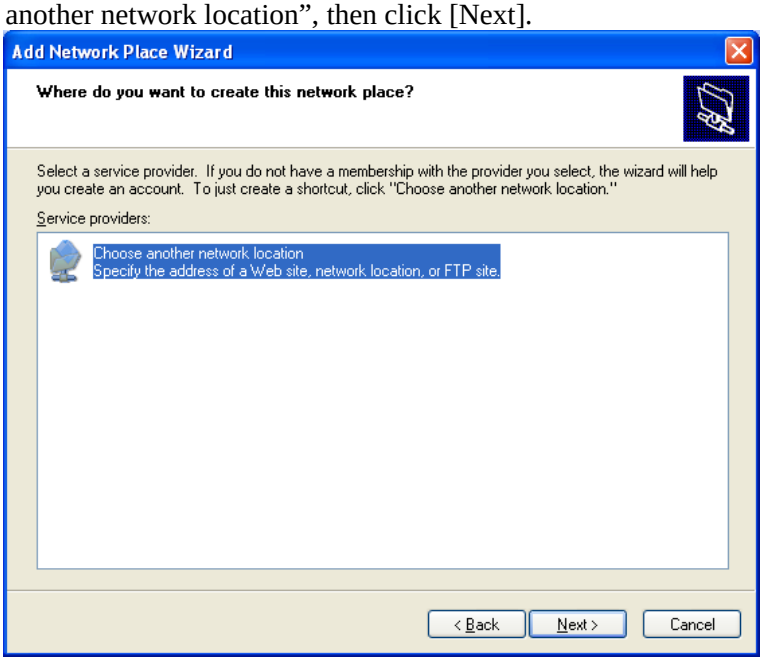
2. Select [Map Network Drive] in the submenu of [Tools] on the menu bar.



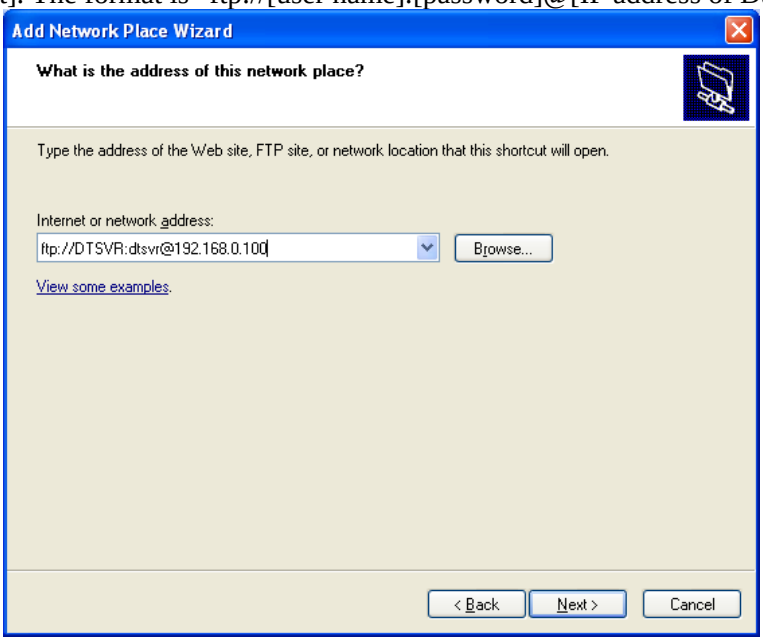
3. Click “Sign up for online storage or connect to a network server.” to start “Add Network Place Wizard”. Next, click [Next].



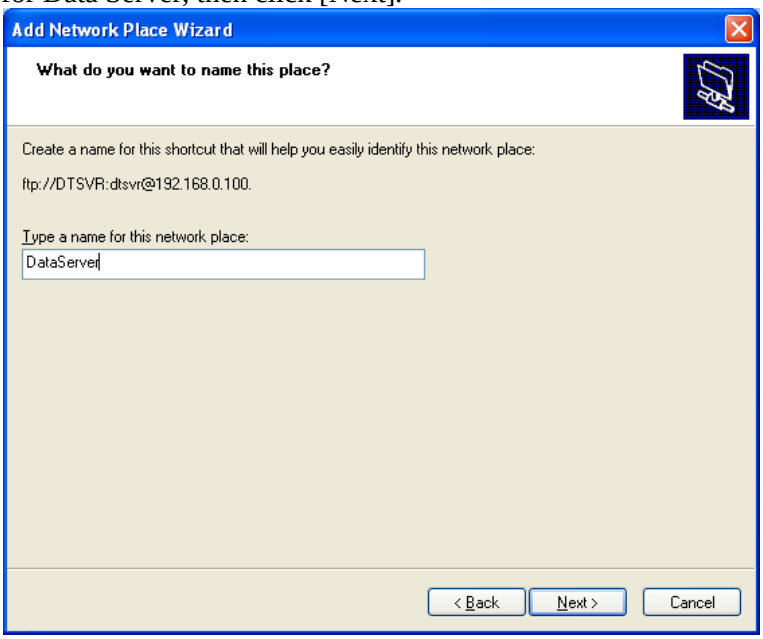
4. Select “Choose another network location”, then click [Next].



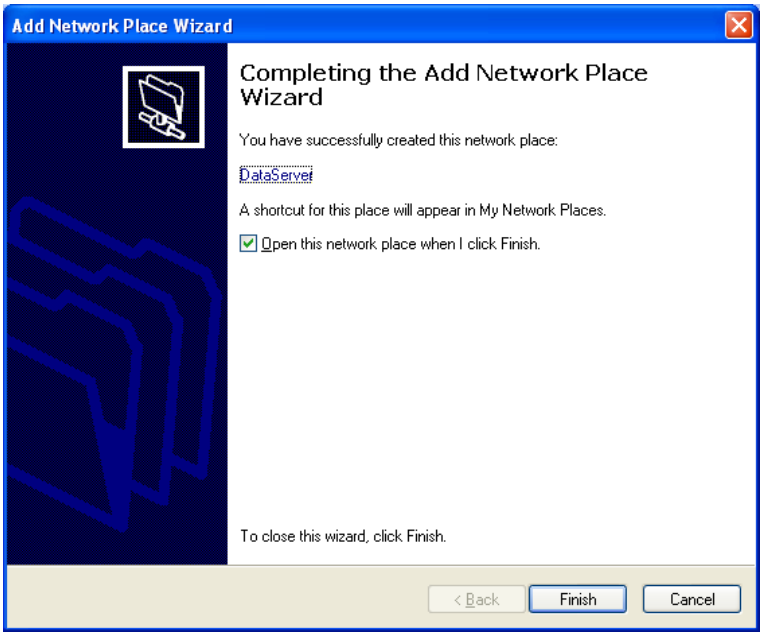
5. Input the user name, the password, and the IP address of Data Server for logging in to Data Server, then click [Next]. The format is “ftp://[user name]:[password]@[IP address of Data Server]”.



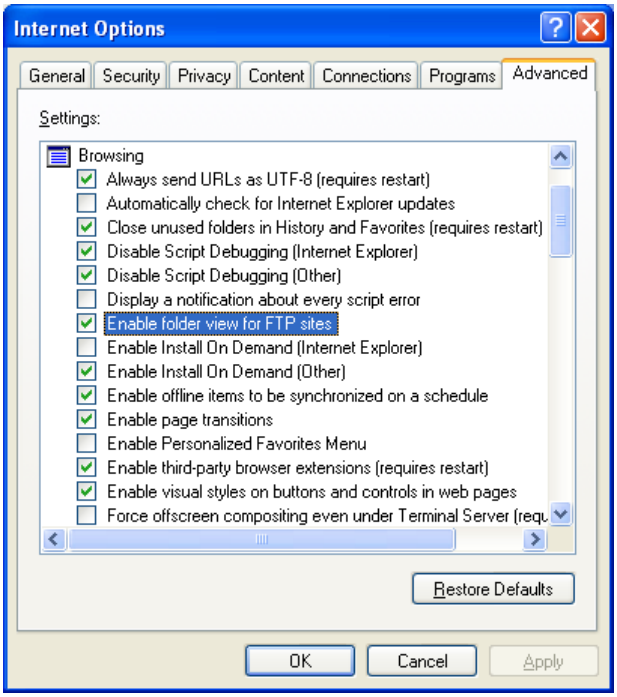
6. Input the name for Data Server, then click [Next].



7. Click [Finish].

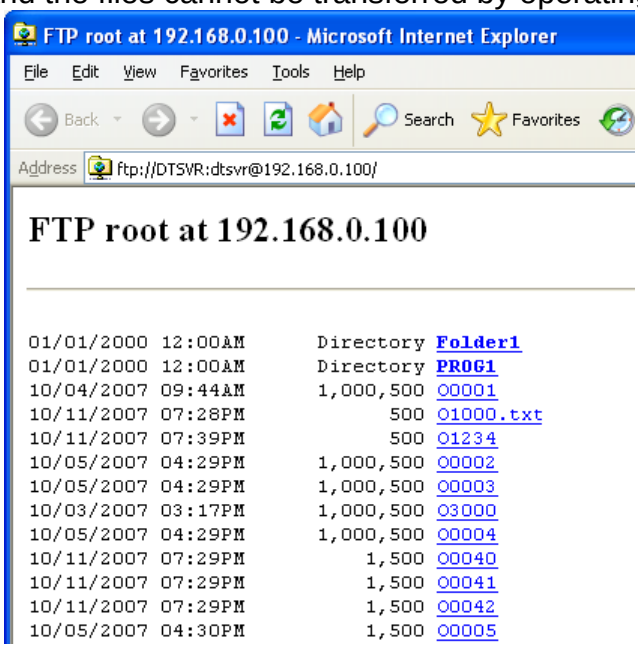


8 Check [Enable folder view for FTP sites] in Internet Options as follows. (This item is checked by default.)

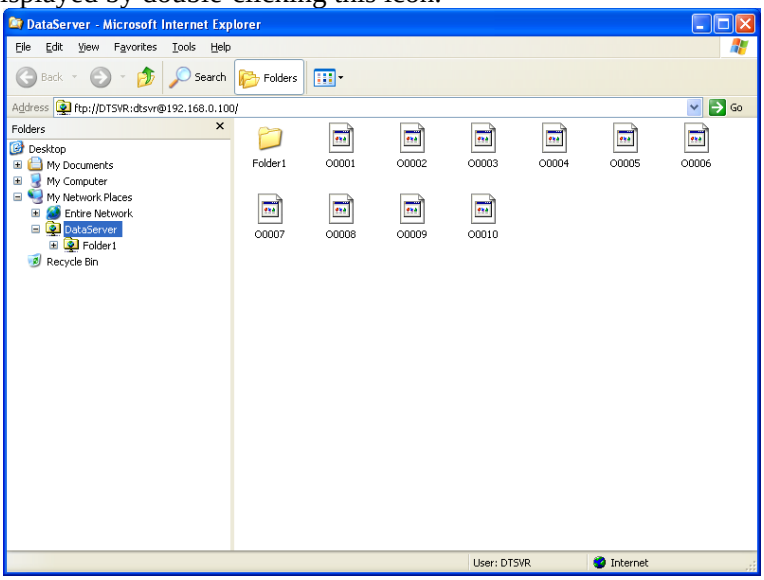


NOTE

If this item is not checked, the file list in Data Server is displayed as shown in the following figure, and the files cannot be transferred by operating drag and drop.

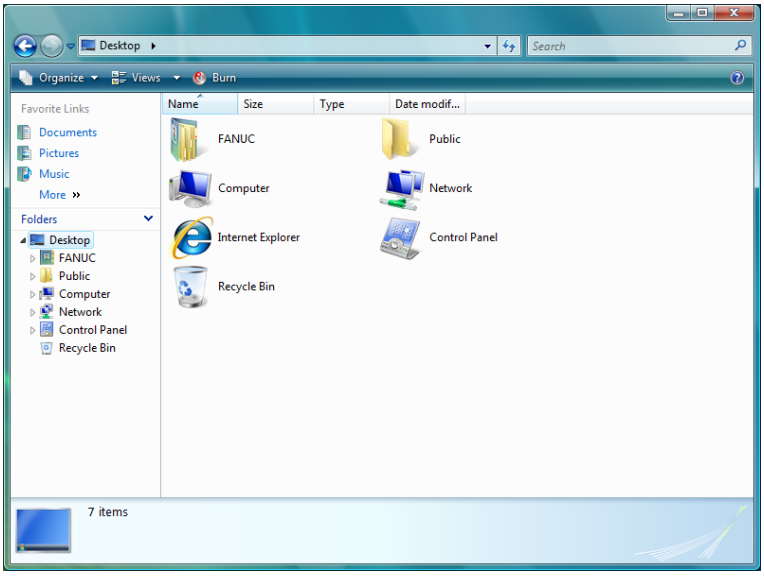


9. The file list in Data Server can be displayed by the Explorer.
   The icon of Data Server is added in My Network Places. For the next time, the file list in Data Server can be displayed by double-clicking this icon.

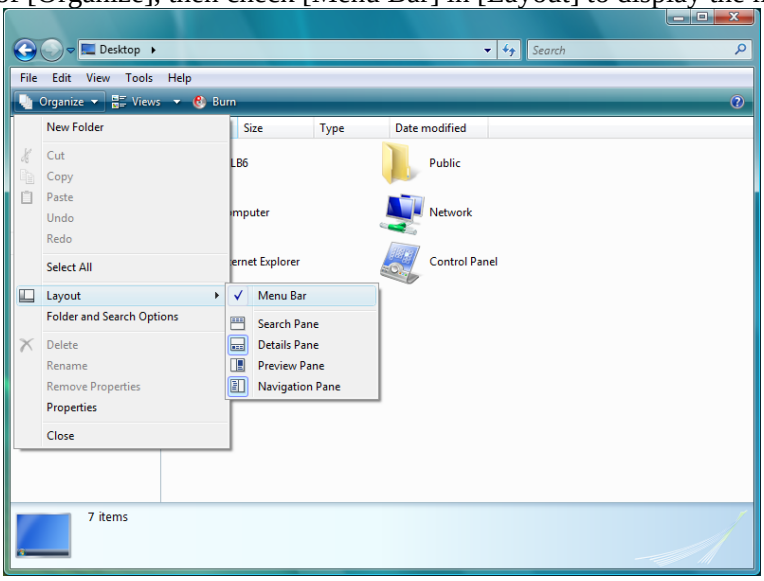


Register Data Server as a Network Location (for Windows Vista Business or Windows 7 Professional)

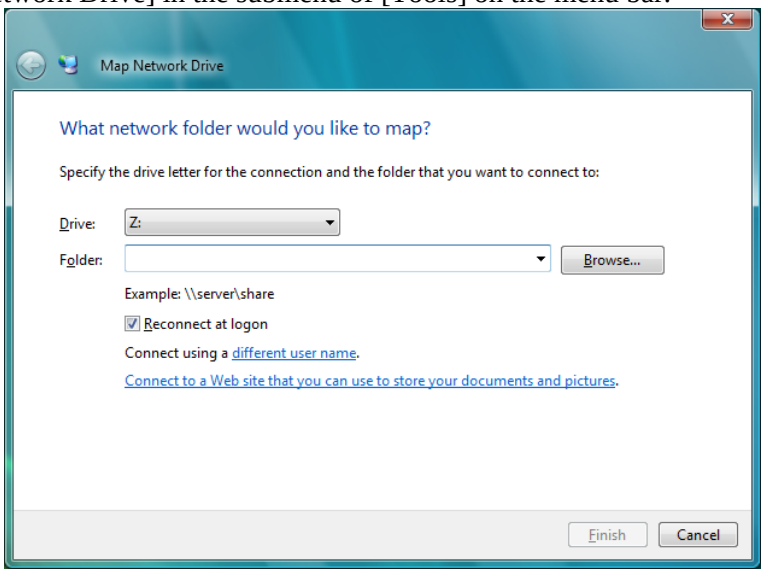
1. Start an Explorer.



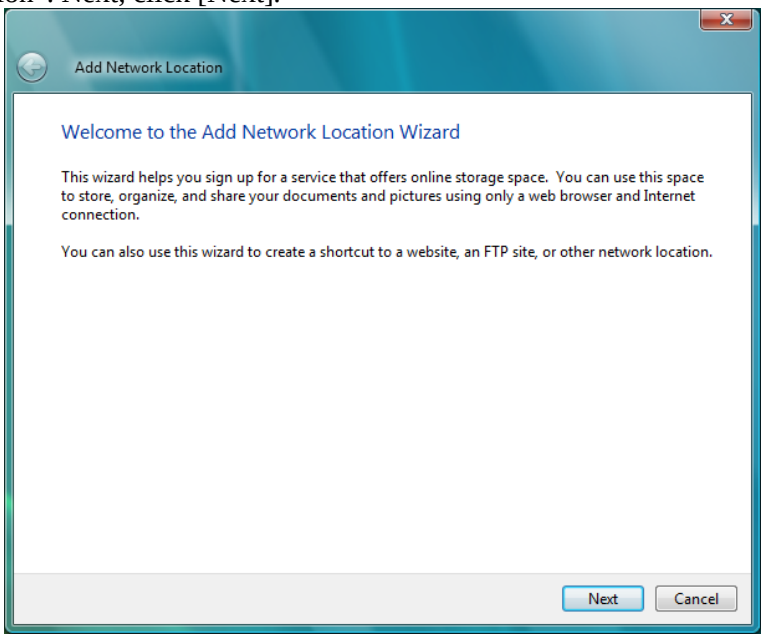
2. Display the menu of [Organize], then check [Menu Bar] in [Layout] to display the menu bar.



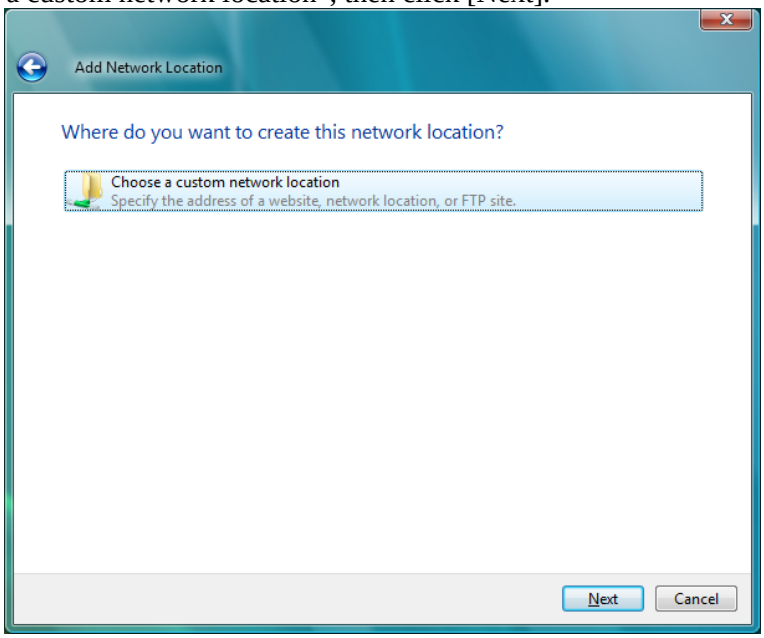
3. Select [Map Network Drive] in the submenu of [Tools] on the menu bar.

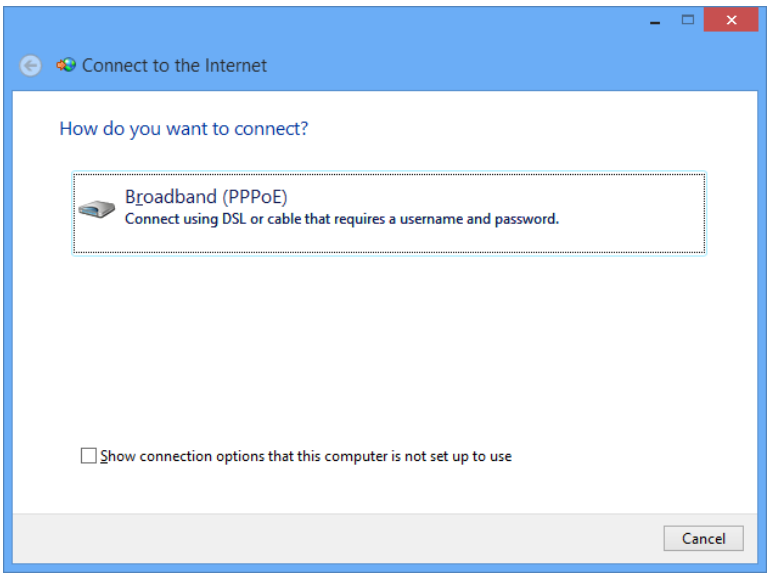


4. Click “Connect to a Web site that you can use to store your documents and pictures.” to start “Add Network Location”. Next, click [Next].



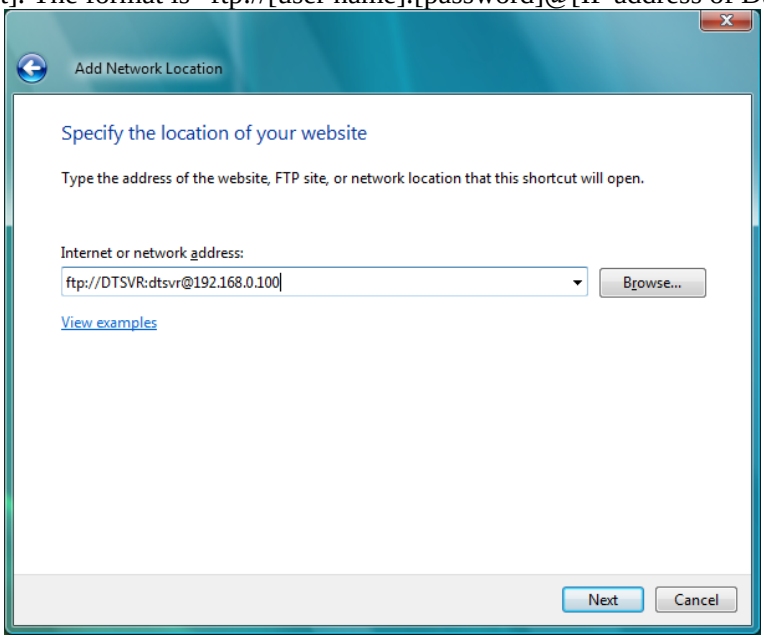
5. Select “Choose a custom network location”, then click [Next].



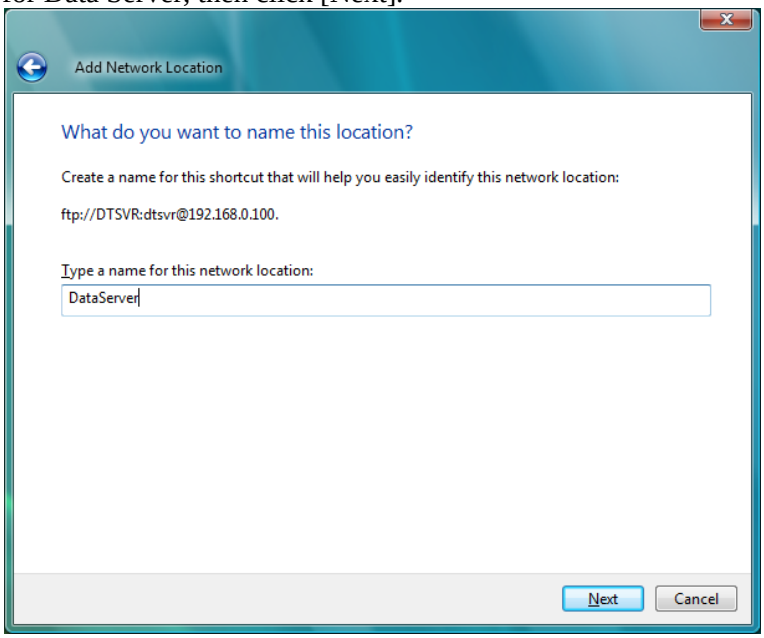


When Windows 7 Professional is used, display “Connect to the internet” and click [Cancel] to display above screen.

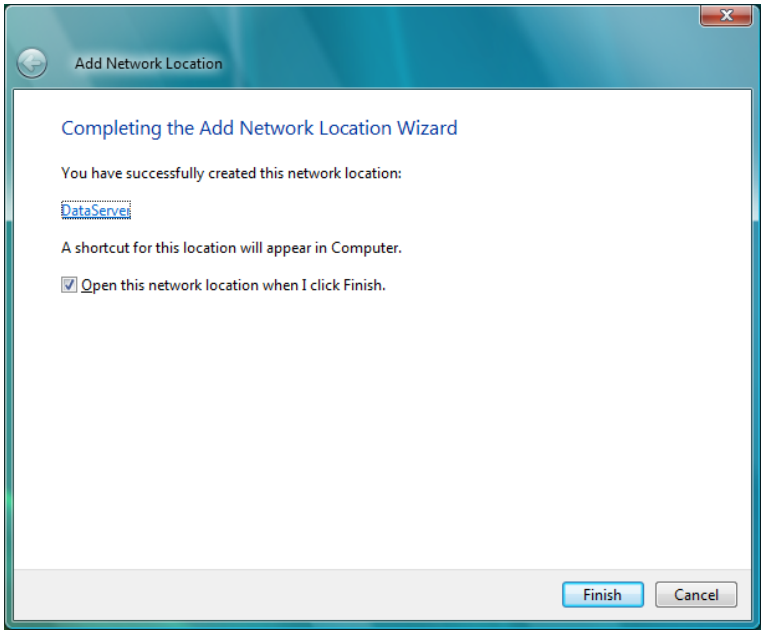
6. Input the user name, the password, and the IP address of Data Server for logging in to Data Server, then click [Next]. The format is “ftp://[user name]:[password]@[IP address of Data Server]”.



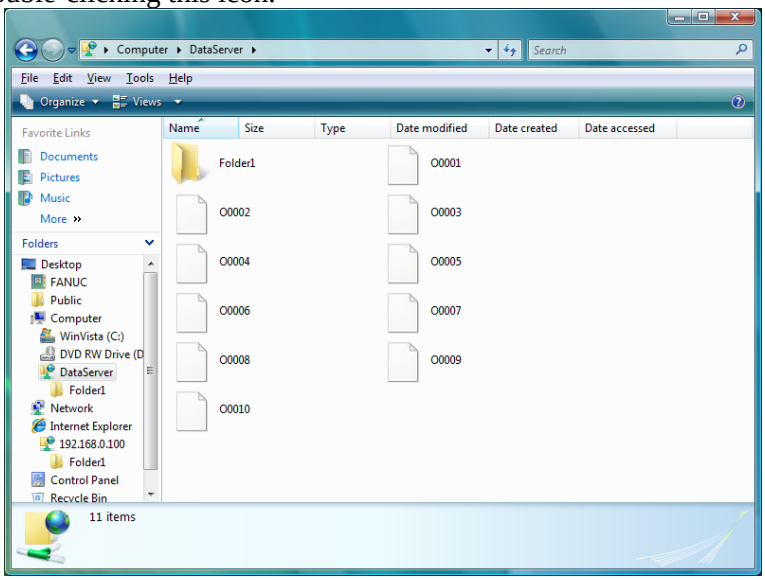
7. Input the name for Data Server, then click [Next].



8. Click [Finish].

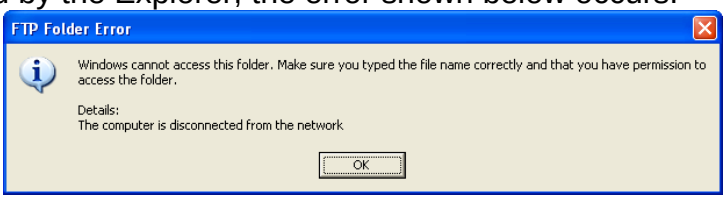


9. The file list in Data Server can be displayed by the Explorer.
The icon of Data Server is added in Computer. For the next time, the file list in Data Server can be displayed by double-clicking this icon.

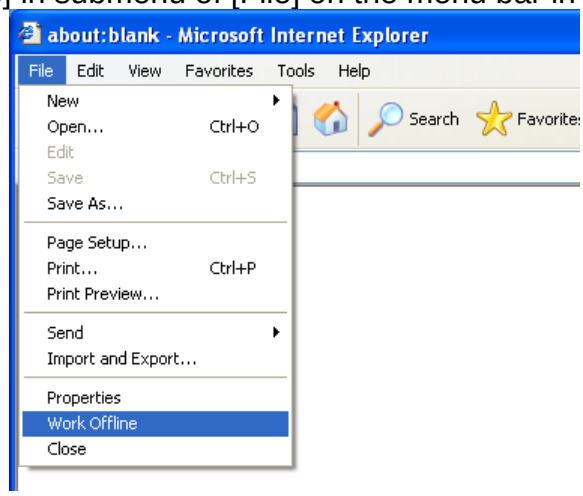


NOTE

1 If Work Offline is run in Internet Explorer, when the file list in Data Server attempt to be displayed by the Explorer, the error shown below occurs.



In this case, it is necessary to stop Work Offline in Internet Explorer. Remove check [Work Offline] in submenu of [File] on the menu bar in Internet Explorer.



2 Even if the file list in Data Server is changed by operating CNC, it is not automatically updated in the Explorer. If the FTP communication with Data Server is not performed for five minutes or more, Data Server disconnects the FTP connection. Execute [Refresh] in the Explorer to acquire the latest file list in Data Server.

D.2.2 File Operation and File Transfer

NOTE

Files in Data Server cannot be copied or moved to another folder in Data Server by standard operation of Windows Explorer.

MOVE FOLDER

A work folder in Data Server can be moved by standard operation of Windows Explorer.

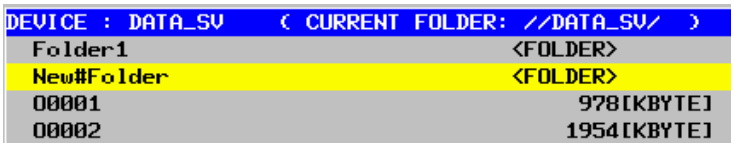
CREATE FOLDER

A new folder can be created in Data Server by standard operation of Windows Explorer.

NOTE

1 To create a new folder in Data Server by standard operation of Windows Explorer, the DataServer Explorer connection option (R953) is required.

2 The name of the folder ("New Folder") made by standard operation of Windows Explorer contains characters that cannot be used in Data Server. Be sure to rename that folder by operation of the Explorer. If not renamed, that folder cannot be used in Data Server.
As shown in the following figure, characters that cannot be used in Data Server are displayed as '#' in DATA SERVER FILE LIST screen.



3 The limitation of Data Server is applied. For details, see Subsection 1.2.1, "Displaying and Operating the File List," in Part IV, "OPERATION."

DELETE

A file or folder (multiple files or folders) in Data Server can be deleted by standard operation of Windows Explorer.

NOTE

1 The folder to be deleted need not be empty. When the folder is not empty, all files and sub-folders in the folder are deleted.

2 There is not limitation of number of files or folders that can be selected at a time.

3 The limitation of Data Server is applied. For details, see Subsection 1.2.1, "Displaying and Operating the File List," in Part IV, "OPERATION."

RENAME

A file or folder in Data Server can be renamed by standard operation of Windows Explorer.

NOTE

The limitation of Data Server is applied. For details, see Subsection 1.2.1, "Displaying and Operating the File List," in Part IV, "OPERATION."

DISPLAY FILE CONTENTS

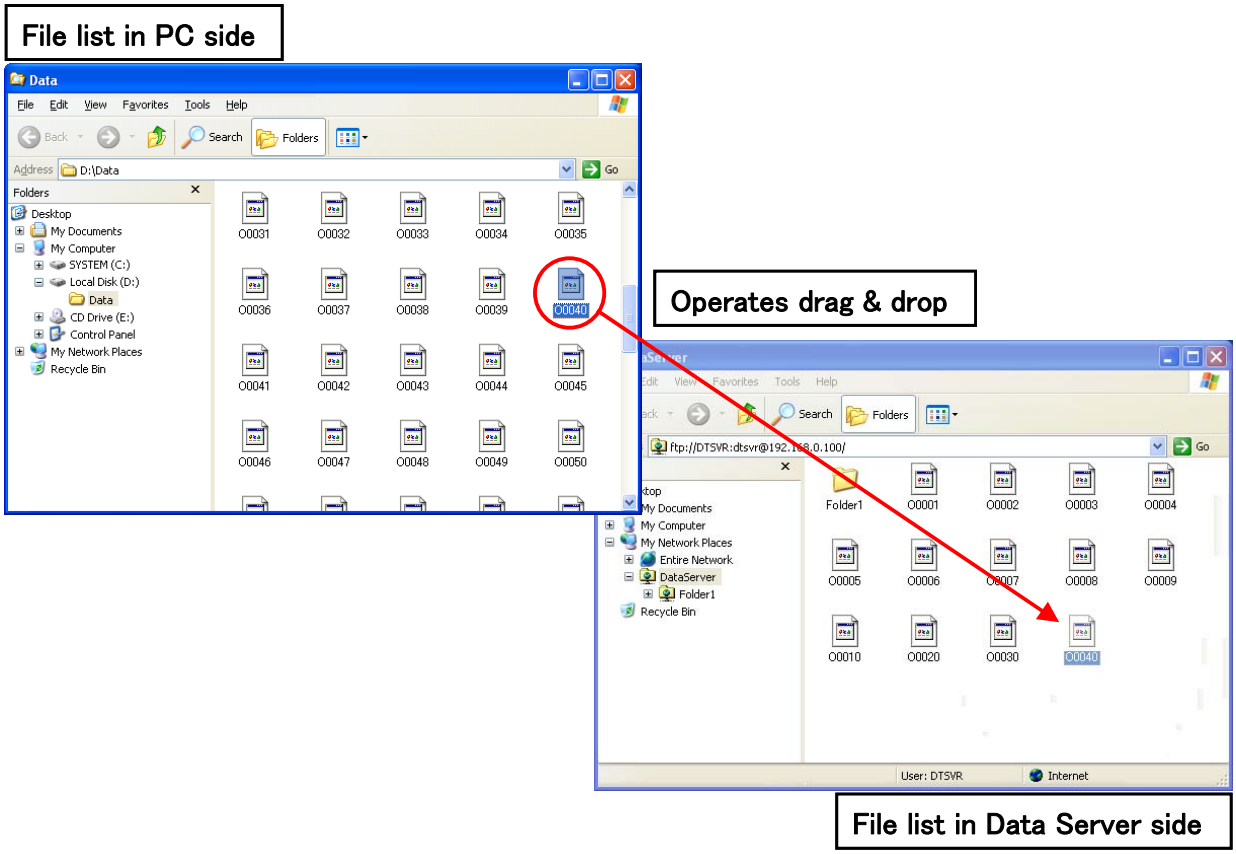
Contents of a file in Data Server can be displayed by standard operation of Windows Explorer.

NOTE

Contents of a file is displayed by Internet Explorer regardless of the relation by the extension.
If a file is not downloaded to the personal computer side, the contents of the file cannot be edited.

FILE TRANSFER

Start two Windows Explorers. One Explorer displays the file list in Data Server, and the other displays the file list in the personal computer.
Some files can be transferred by operating drag and drop from one window to the other.
The figure below shows the example that a file in the personal computer side is transferred to the Data Server side.



Example of file transfer by using Windows Explorer

NOTE

1 If an error occurs, check the cause of the error according to the Item, “ETHERNET LOG screen” in Section 2.1, ”ETHERNET LOG” in Part VI, “MAINTENANCE.”
2 Files cannot sometimes be transferred depending on the operation status and protection status.
3 The attribute of files to be transferred by using Windows Explorer is fixed to binary. When NC programs are transferred as text files, fix the attribute to text by the setting of parameter No.929. For details, see Section 2.2, "RELATED NC PARAMETERS," in Part III, "SETTING."
4 When a file is transferred to Data Server, if a file having the same name as a file to be transferred from the personal computer is already present on Data Server, by the setting of bit 2 of parameter No.906, you can select whether the existing file is overwritten or an error is caused. For details, see Section 2.2, "RELATED NC PARAMETERS," in Part III, "SETTING."

D.3 SECURITY UNBLOCKING IN Windows XP (Service Pack 2) / Vista

When an attempt is made to start FTP communication for the first time in Windows XP (Service Pack 2) or Windows Vista, the security alert shown below may appear.
If the alert appears, consult with the network administrator, and select "Unblock" as necessary.

Security Alert of Windows XP (Service Pack 2)

Security Alert of Windows Vista

> ⚠ **CAUTIOJN**
> Since selecting "Unblock" means change in settings related to network security, be sure to consult with the network administrator in advance.
> If "Unblock" is selected carelessly, network security can be compromised.

ADDITIONAL INFORMATION

FANUC Series 30*i*–MODEL A/B
FANUC Series 31*i*–MODEL A/B
FANUC Series 32*i*–MODEL A/B
FANUC Series 35*i*–MODEL B
FANUC Power Motion *i*–MODEL A
FANUC Series 0*i*–MODEL F
Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
The addition of the example of setting up FTP Server on Windows 10

1. Type of applied technical documents

Name	FANUC Series 30*i*–MODEL A/B FANUC Series 31*i*–MODEL A/B FANUC Series 32*i*–MODEL A/B FANUC Series 35*i*–MODEL B FANUC Power Motion *i*–MODEL A FANUC Series 0*i*–MODEL F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Spec.No./Version	B-64014EN/07

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function			
Unit			
Maintenance parts			
Notice			
Correction			
Another	The example of setting up FTP Server on Windows 10 and troubleshooting has been added.		

Edit	Date	Design	Description

Date	07.05.2016	Design	T.Ikki	Apprv.	

Title	Fast Ethernet / Fast Data Server OPERATOR'S MANUAL The addition of the example of setting up FTP Server on Windows 10
Draw No.	**B-64014EN/07-01**
FANUC CORPORATION	Sheet 1/29

For Chapter A "TROUBLESHOOTING" in "APPENDIX" of B-64014EN/07:

- Add Section A.4 "TROUBLESHOOTING OF DATA SERVER FUNCTION" with this report.

A.4 TROUBLESHOOTING OF DATA SERVER FUNCTION

A.4.1 DNC Operation or M198-Based Subprogram Calling

This section enumerates the problems and its solutions occurred when DNC operation or M198-based subprogram calling is performed.

A.4.1.1 An alarm occurs when an NC program is performed long time

Conditions)

Host computer : Windows
FTP Server : IIS (Internet Information Service)
The condition of the Data Server mode : FTP mode

Phenomenon)

(1) An alarm occurs while operating if the feedrate of the NC program is slow.
(2) An alarm occurs while operating if the size of the NC program is large.
(3) An alarm occurs while operating if the NC program with long execution time of one block is performed.

> **NOTE**
> The following alarms may occur.
> - SR2032 "EMBEDDED ETHERNET/DATA SERVER ERROR"
> - PS1079 "NO FILE SELECTED"
> - PS1014 "ILLEGAL FORMAT OF PROGRAM NO.", and so on.
>
> Which alarm occurs depends on the mode of the CNC, the situation of FTP communication, and the other operating environment.

Cause)

The FTP server in the host computer disconnects the communication with the FTP client (CNC) for one of the following reasons.

1 Timeout occurs because the non-communication time to the FTP client is long.
2 Timeout occurs because the time that FTP server cannot send data to FTP client is long.

Solution)

Since these causes are the specifications of the host computer, the phenomenon can be prevented by changing the setting of the FTP server on the host computer.
Please change the following three settings.

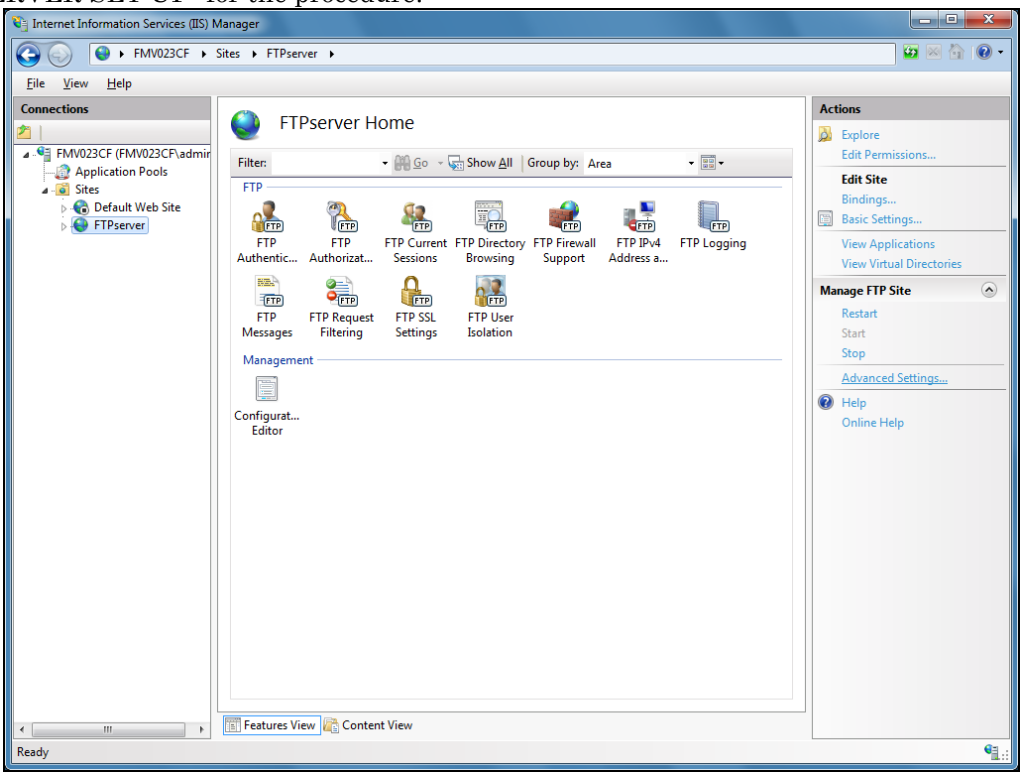
- Changing the timeout value of IIS.
- Changing the timeout value of Ethernet driver.
- Disabling the check on the data traffic of IIS.

NOTE

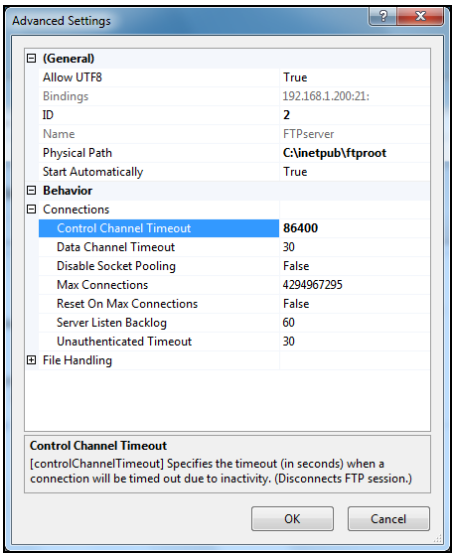
The following procedure is the procedure in the case of Windows 7.
The procedure is nearly the same in the case of Windows 10.

Changing the timeout value of IIS

1 Open [Internet Information Services (IIS) Manager].
Please refer to [Setting Internet Information Service] in Chapter B "EXAMPLE OF FTP SERVER SET UP" for the procedure.



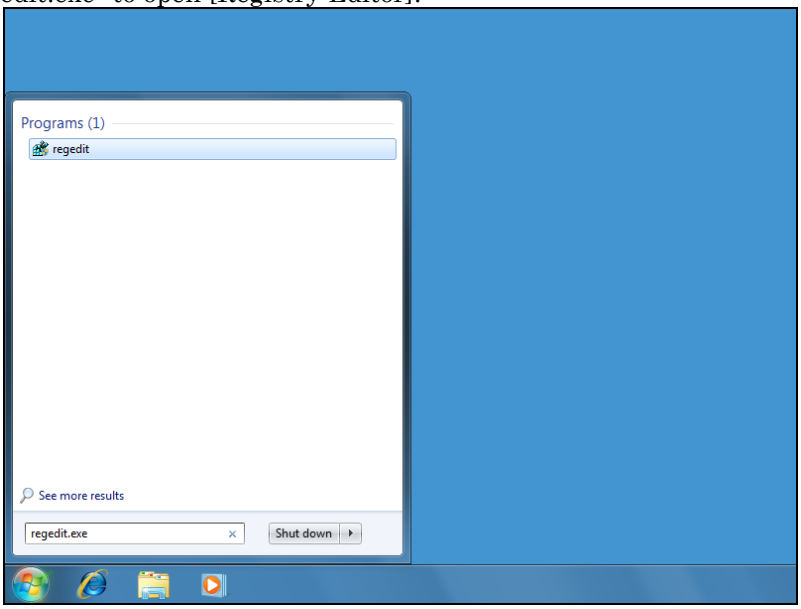
2 Click [Advanced Settings...] of [Manage FTP Site] in the right pane to open the Advanced Setting screen. Then change [Control Channel Timeout] in [Connections] from 120 "sec" to 86400 "sec" (24 hours).
Click [OK] button.



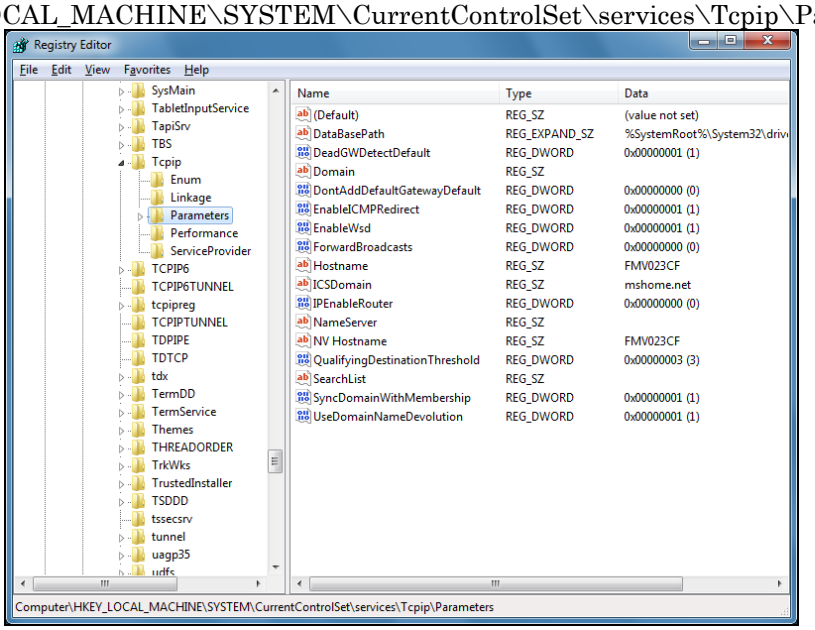
Changing the timeout value of Ethernet driver

⚠CAUTION
Incorrectly editing the registry may severely damage your system.
Before making changes to the registry, you should back up any valued data on your computer.

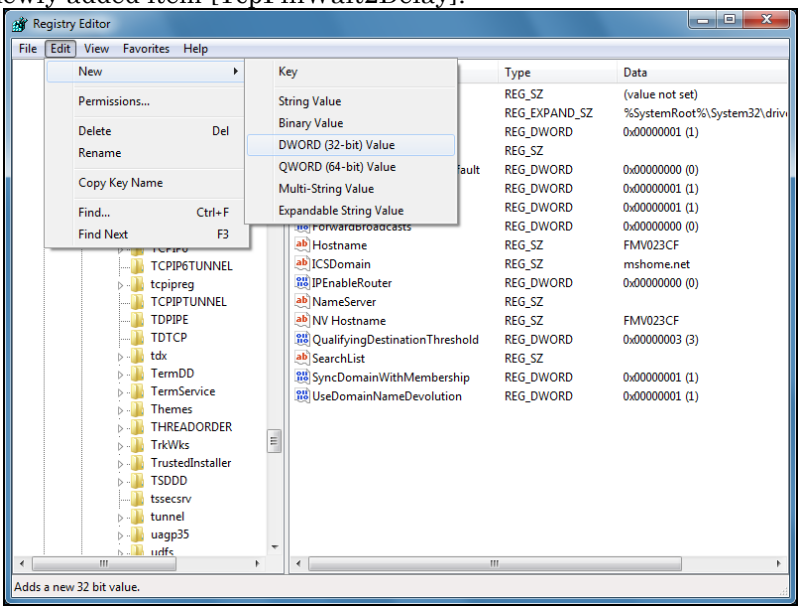
1 Click the start button to open the start menu.
Search "regedit.exe" to open [Registry Editor].



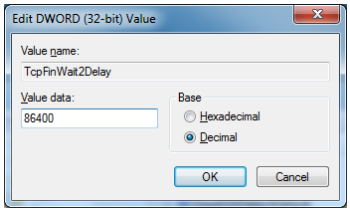
2 Expand the list, and open
"HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\services\Tcpip\Parameters".



3 Confirm whether there is [TcpFinWait2Delay] in [Parameters].
If there is [TcpFinWait2Delay], proceed to the next step 4.
If there is no [TcpFinWait2Delay], click [Edit] in the menu with [Parameters] selected, then click [DWORD (32-bit) Value] in [New] to add it.
Name the newly added item [TcpFinWait2Delay].

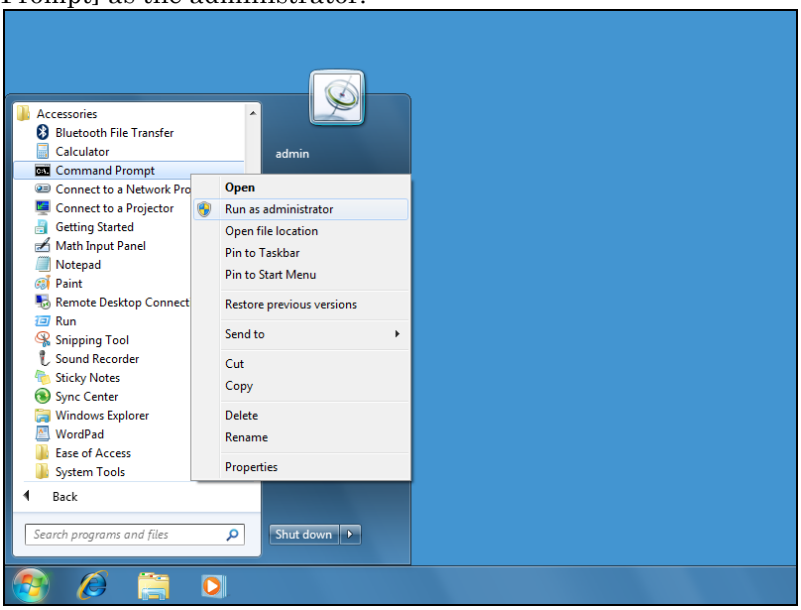


4 Click [Edit] in the menu with [TcpFinWait2Delay] selected, then click [Modify...] to open [Edit DWORD (32-bit) Value].
Check [Decimal] in [Base], then set [Value data] to 86400 "sec" (24 hours).
Click [OK] button.

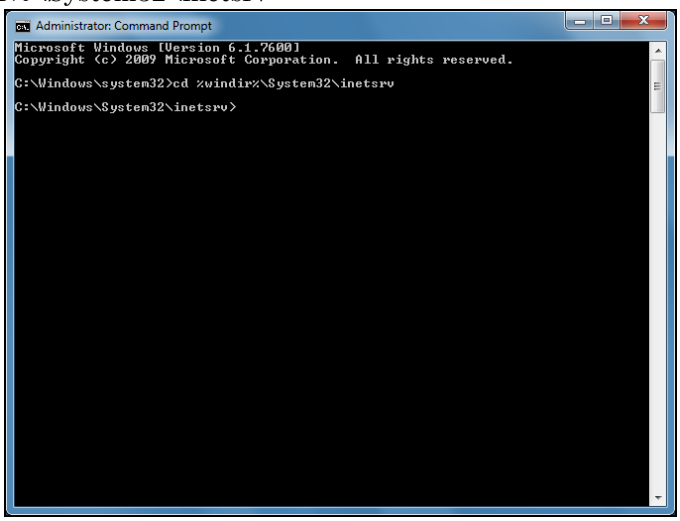


Disabling the check on the data traffic of IIS

1 Click the start button to open the start menu.
Click [All Programs], then expand [Accessories].
Right-click [Command Prompt] in [Accessories], then click [Run as administrator] to open [Command Prompt] as the administrator.



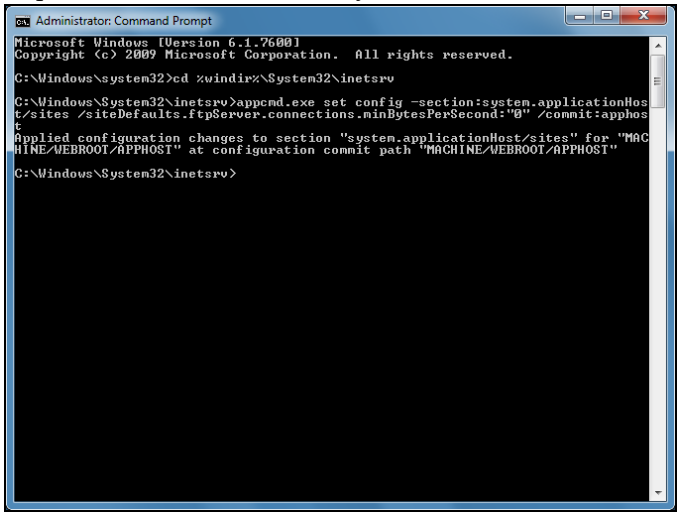
2 Type the following command in [Command Prompt].
cd␣%windir%\System32\inetsrv



NOTE
If you are running 64-bit Windows, change the current directory to the %windir%\system32\inetsrv directory, not to the %windir%\syswow64\inetsrv directory.

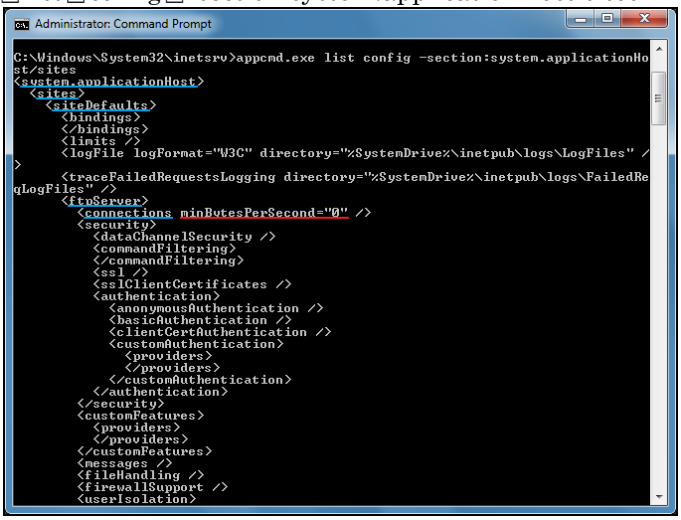
3 Type the following command in [Command Prompt] to set the value of [minBytesPerSecond] to "0".

appcmd.exe␣set␣config␣-section:system.applicationHost/sites␣
/siteDefaults.ftpServer.connections.minBytesPerSecond:"0"␣/commit:apphost



4 To confirm the value of [minBytesPerSecond], type the following command in [Command Prompt].

appcmd.exe␣list␣config␣-section:system.applicationHost/sites



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For Chapter B "EXAMPLE OF FTP SERVER SET UP" in "APPENDIX" of B-64014EN/07:

- Add Section B.6 "SETTING UP FTP SERVER OF Windows 10 Pro (FOR INTERNET INFORMATION SERVICE)" with this report.

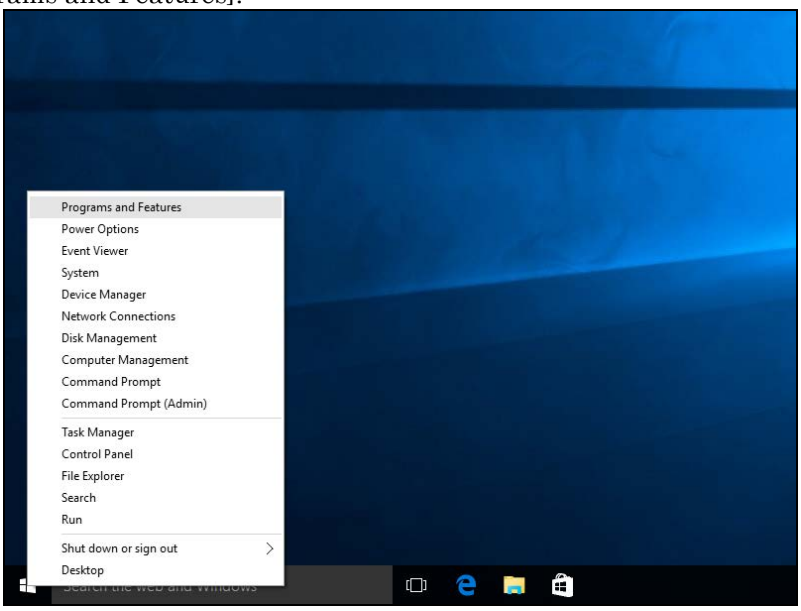
B.6 SETTING UP FTP SERVER OF Windows 10 Pro (FOR INTERNET INFORMATION SERVICE)

NOTE

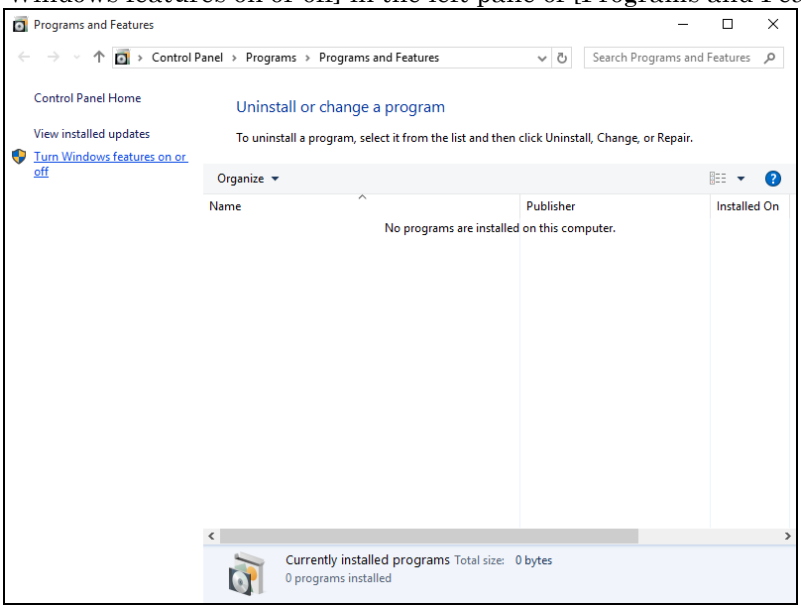
When Windows 10 is used, Windows 10 Pro is recommended by occasion of the specification of user account management.

Installing the Internet Information Service

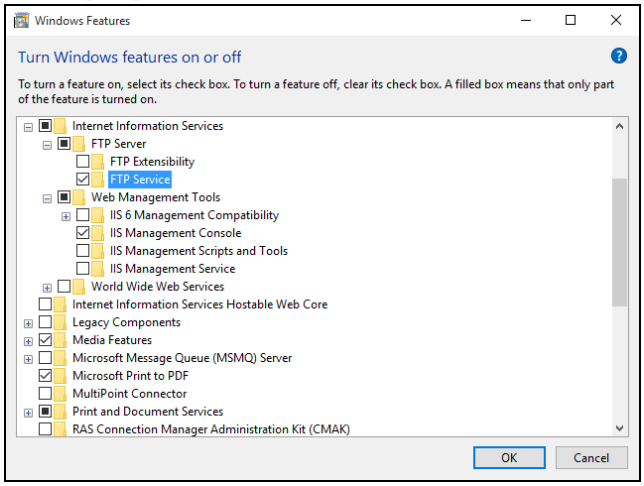
1 Right-click the start button to open the quick access menu.
Click [Programs and Features].



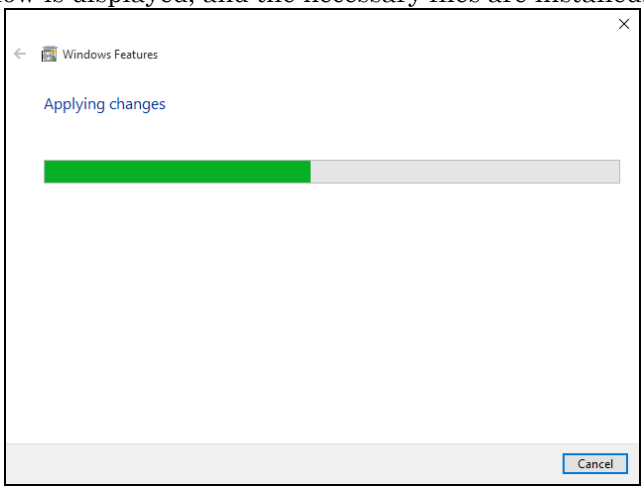
2 Click [Turn Windows features on or off] in the left pane of [Programs and Features].



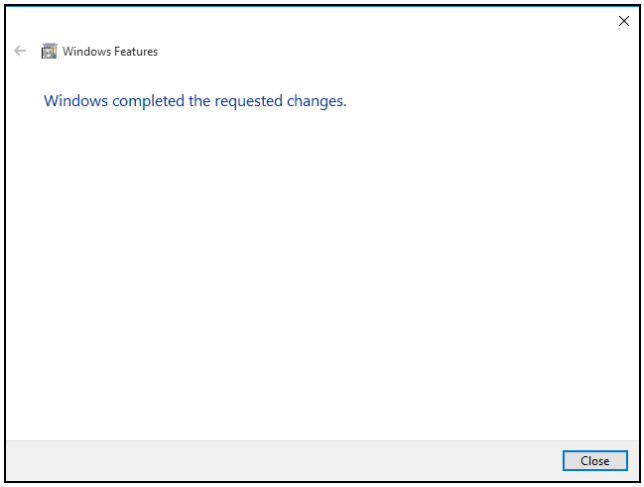
3 Expand [Internet Information Services] in the features list.
Check [FTP Service] in [FTP Server] and [IIS Management Console] in [Web Management Tools].
When finished, click the [OK] button.



4 The dialog box below is displayed, and the necessary files are installed.

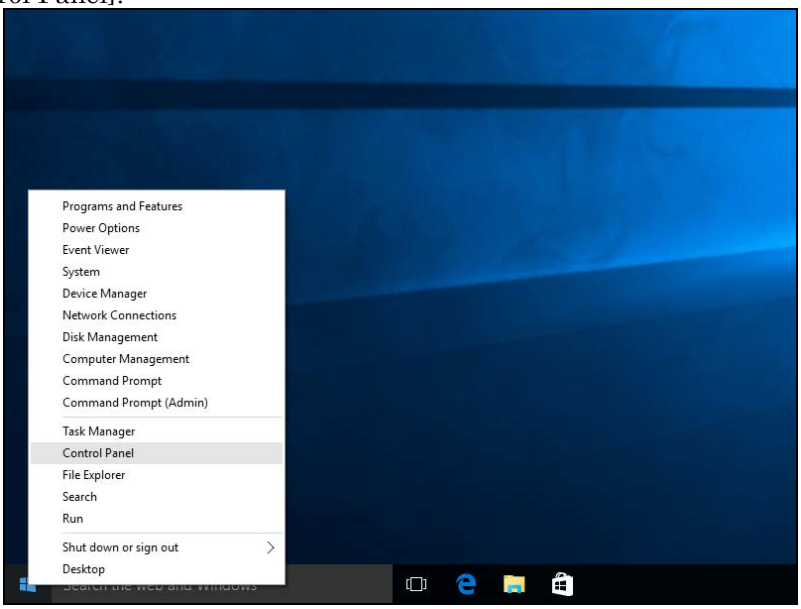


5 When the installation is completed, the following dialog box is displayed.
Click the [Close] button.

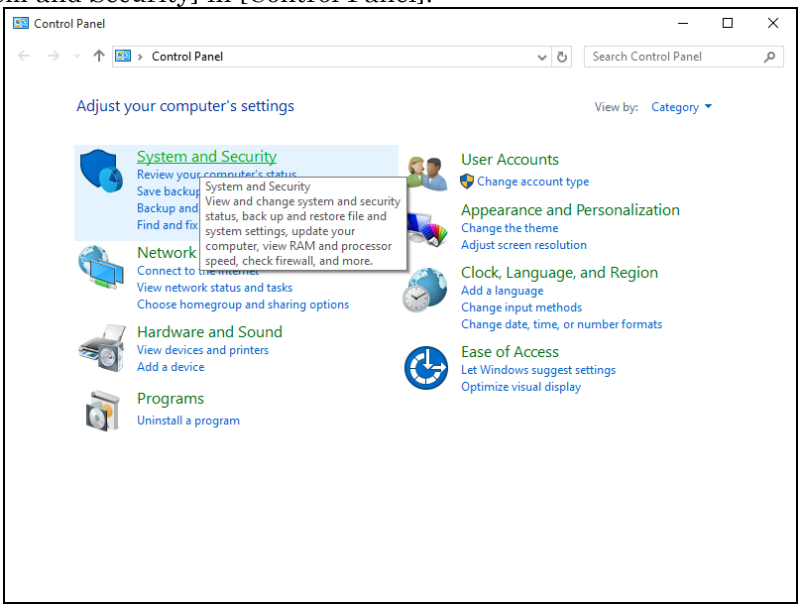


Setting the Internet Information Service

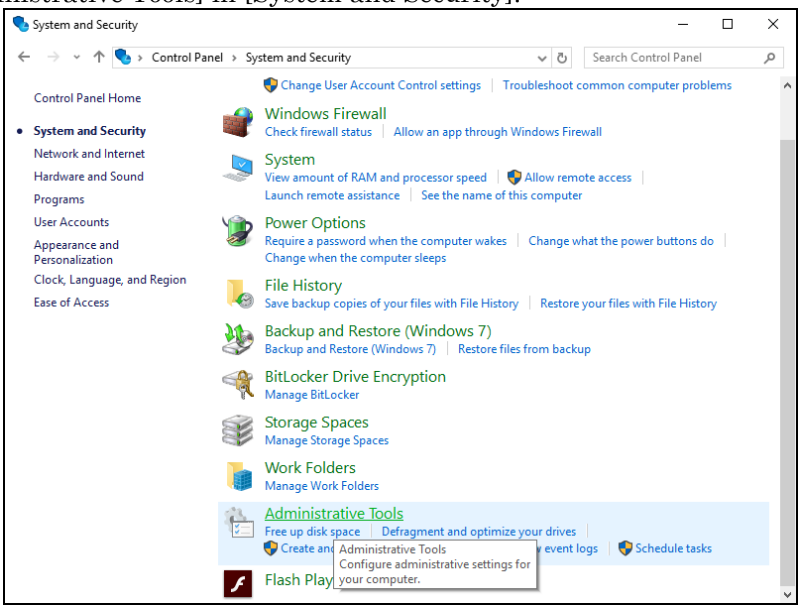
1 Right-click the start button to open the quick access menu.
Click [Control Panel].



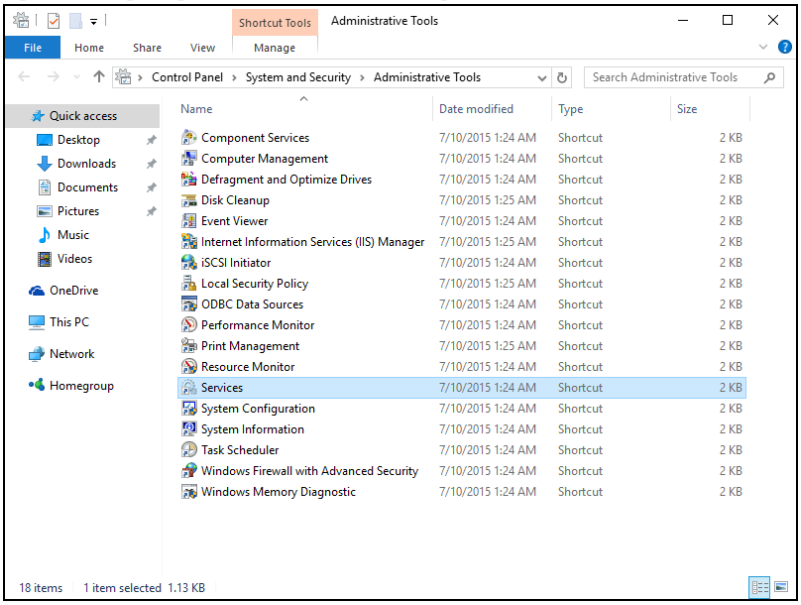
2 Click [System and Security] in [Control Panel].



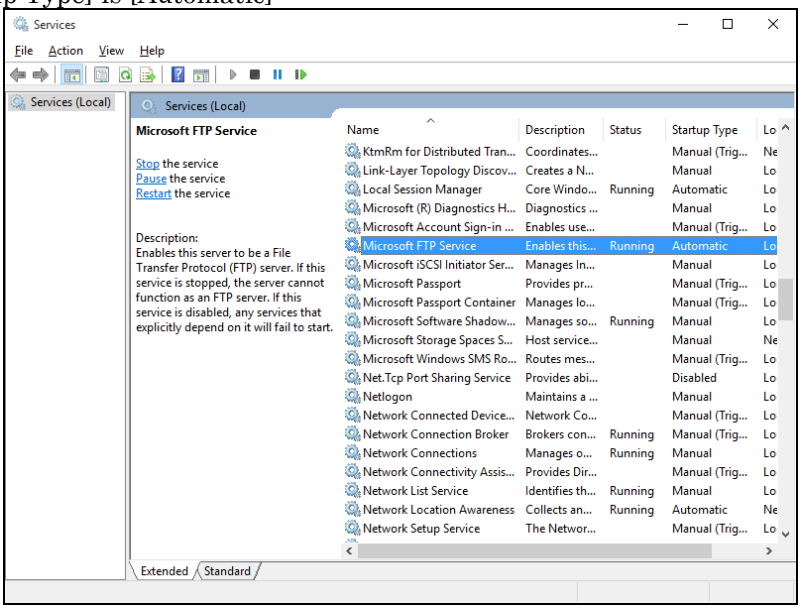
3 Click [Administrative Tools] in [System and Security].



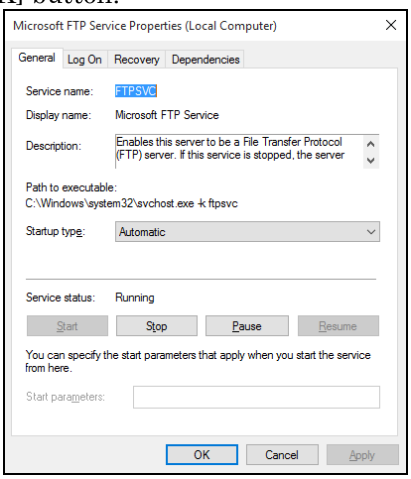
4 Double-click [Services] in [Administrative Tools] to start it.



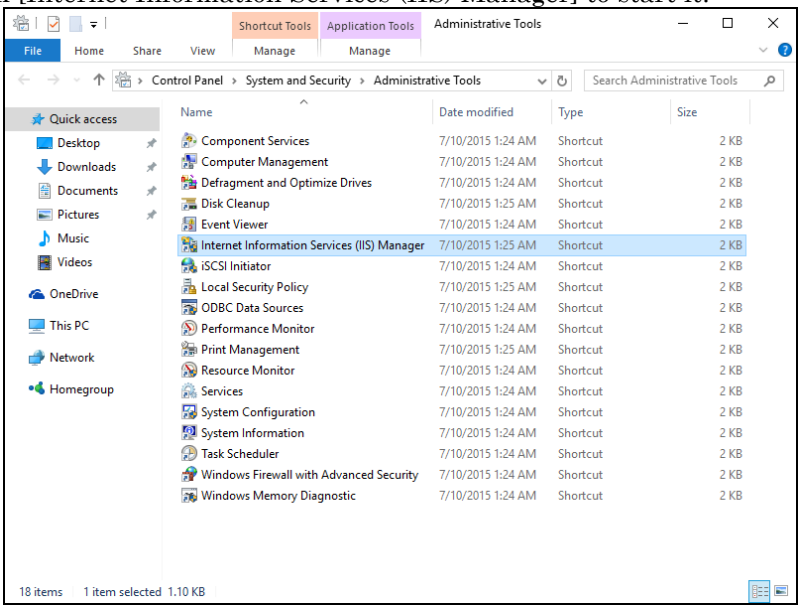
5 Confirm the following of [Microsoft FTP Service] in the service list.
- [Status] is [Running]
- [Startup Type] is [Automatic]



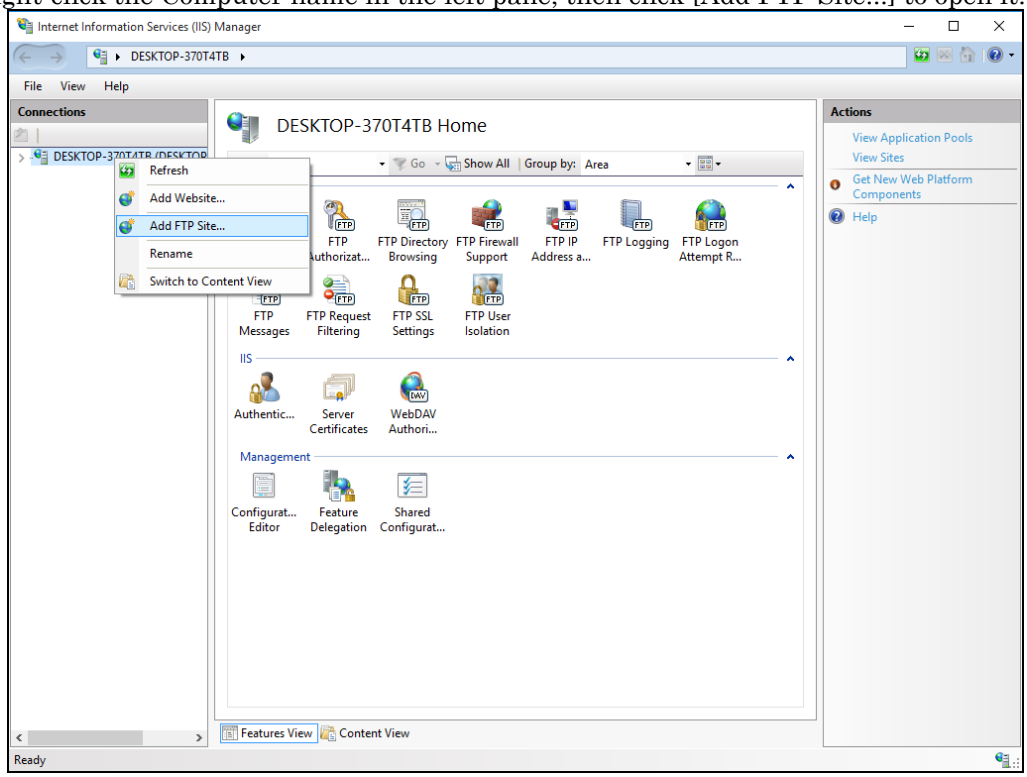
6 If the setting of Microsoft FTP Service is not the value mentioned in item 5, double-click [Microsoft FTP Service] in the service list to open the property.
Display the [General] property sheet.
Choose [Automatic] from [Startup type] drop-down list.
Next, when [Service status] is not [Running], click the [Start] button to start FTP service.
When finished, click the [OK] button.



7 Return to [Administrative Tools].
Double-click [Internet Information Services (IIS) Manager] to start it.



8 Right-click the Computer name in the left pane, then click [Add FTP Site...] to open it.



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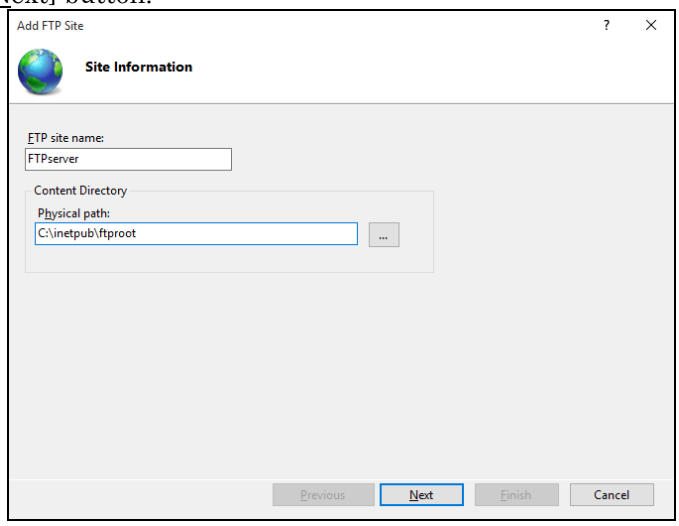
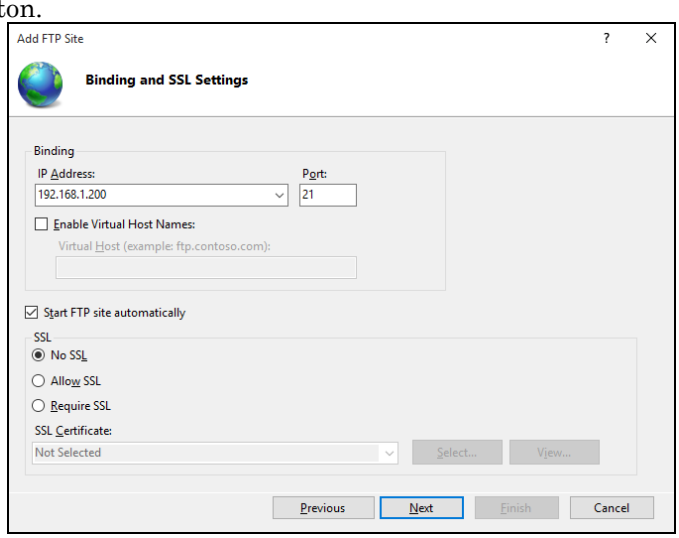
9 In the displayed [Site Information] dialog box below, set the name of an FTP site to be created in [FTP site name:] and the path to the FTP server home directory in [Physical path:] in [Content Directory].
Then click the [Next] button.

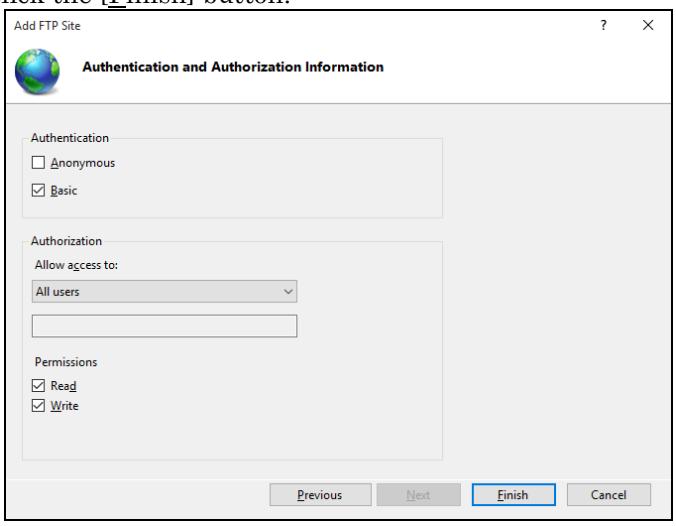


NOTE
The FTP clients can access only the directories under the home directory set in this step. To access a directory other than the directories under the home directory set, a virtual directory needs to be set.
For details of a virtual directory, use information such as the online help information of Windows 10.

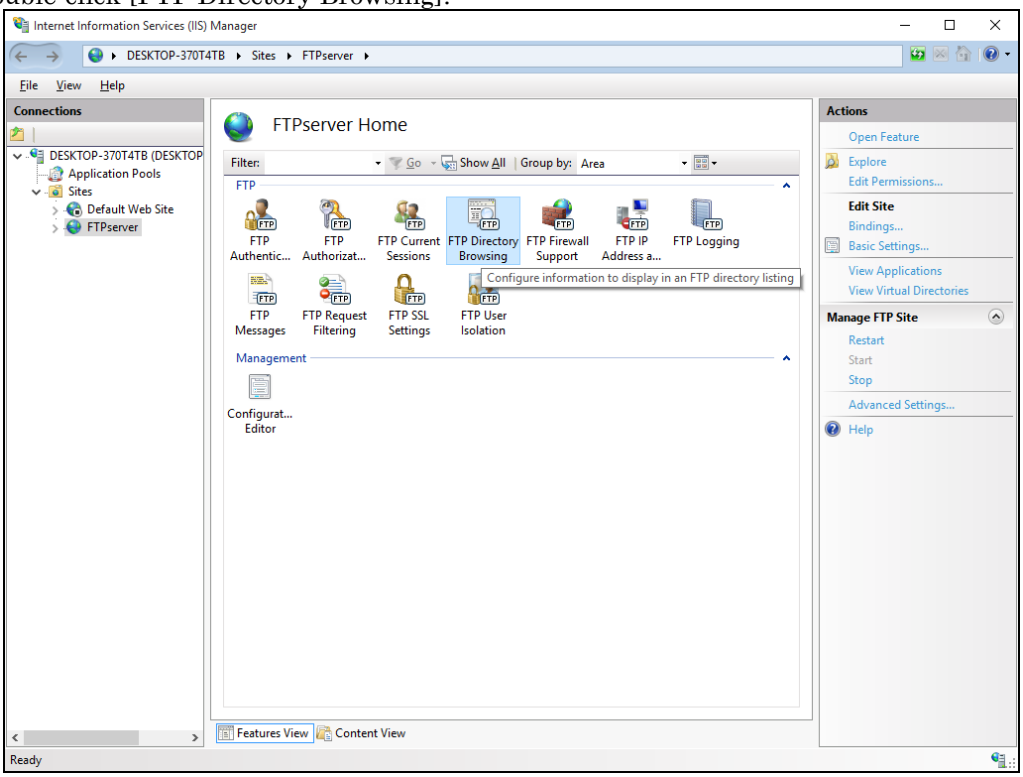
10 The [Binding and SSL setting] dialog box below is displayed.
Input the IP address and port number (usually 21) in [IP Address] and [Port].
Check [Start FTP site automatically] and select [No SSL] in [SSL].
Click [Next] button.



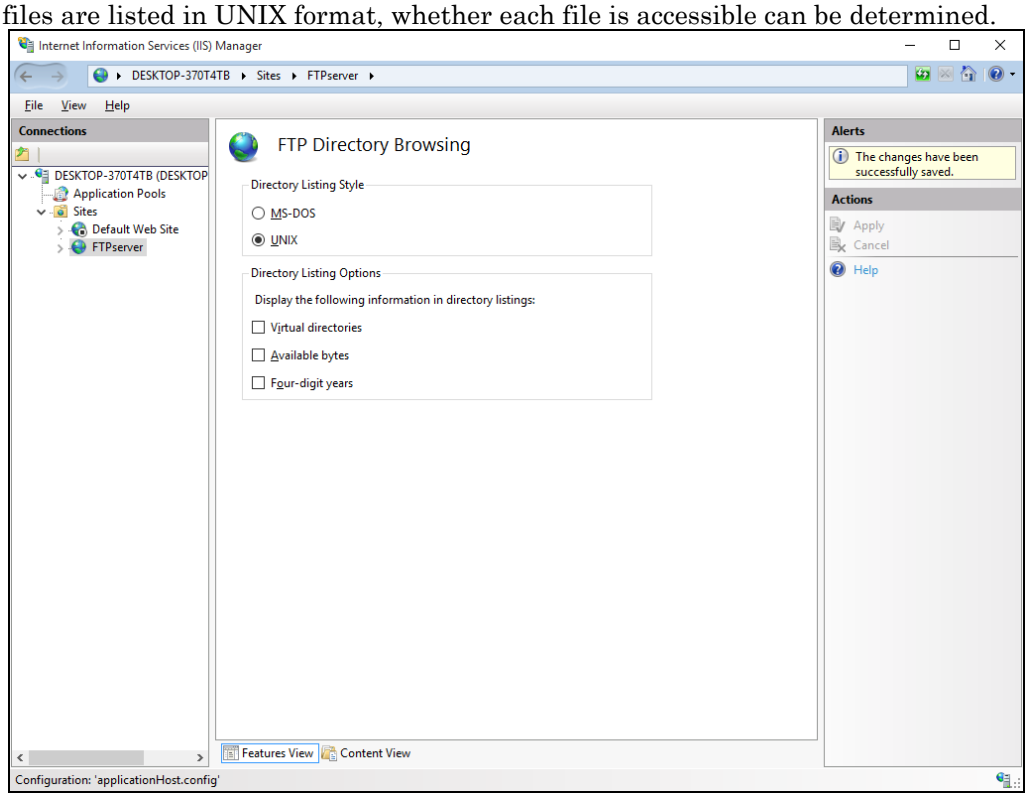
11 The [Authentication and Authorization Information] dialog box below is displayed.
Check [Basic] in [Authentication], choose [All users] from [Allow access to:] drop-down list in [Authorization], and check [Read] and [Write] in [Permissions].
When finished, click the [Finish] button.



12 Expand tree in left pane and select FTP site name set in step 9.
A feature menu of FTP site is displayed.
Double-click [FTP Directory Browsing].



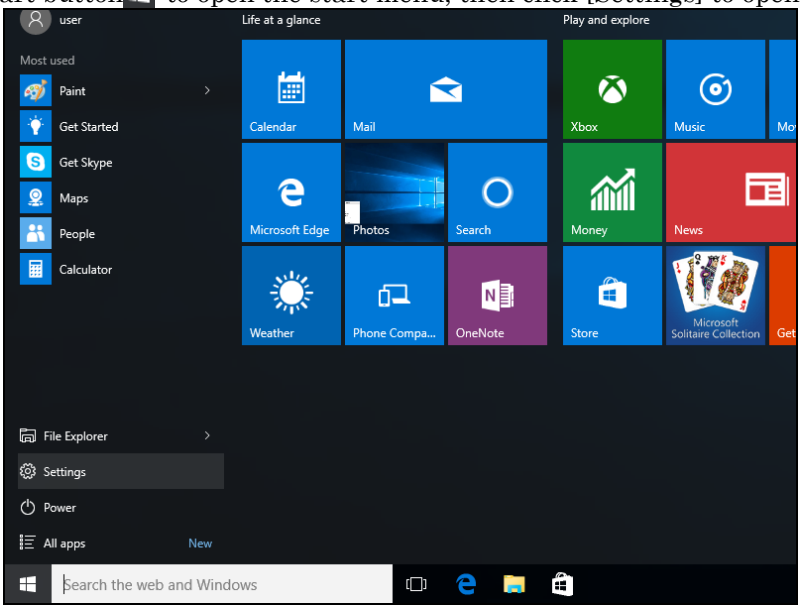
13 In [Directory Listing Style], [MS-DOS] is selected by default.
However, it is recommended to select [UNIX].
If files are listed in UNIX format, whether each file is accessible can be determined.



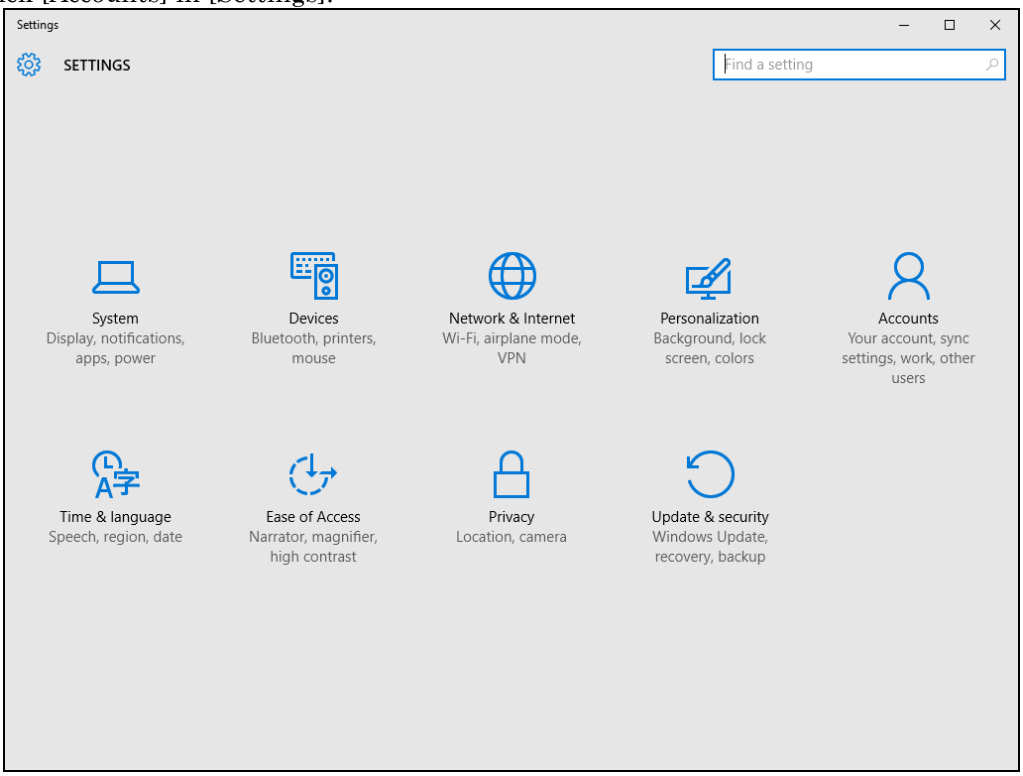
Login User Settings

Create a login user to access the FTP server.
If you want to access the FTP server using a user account already created in the PC, you need not make this setting.

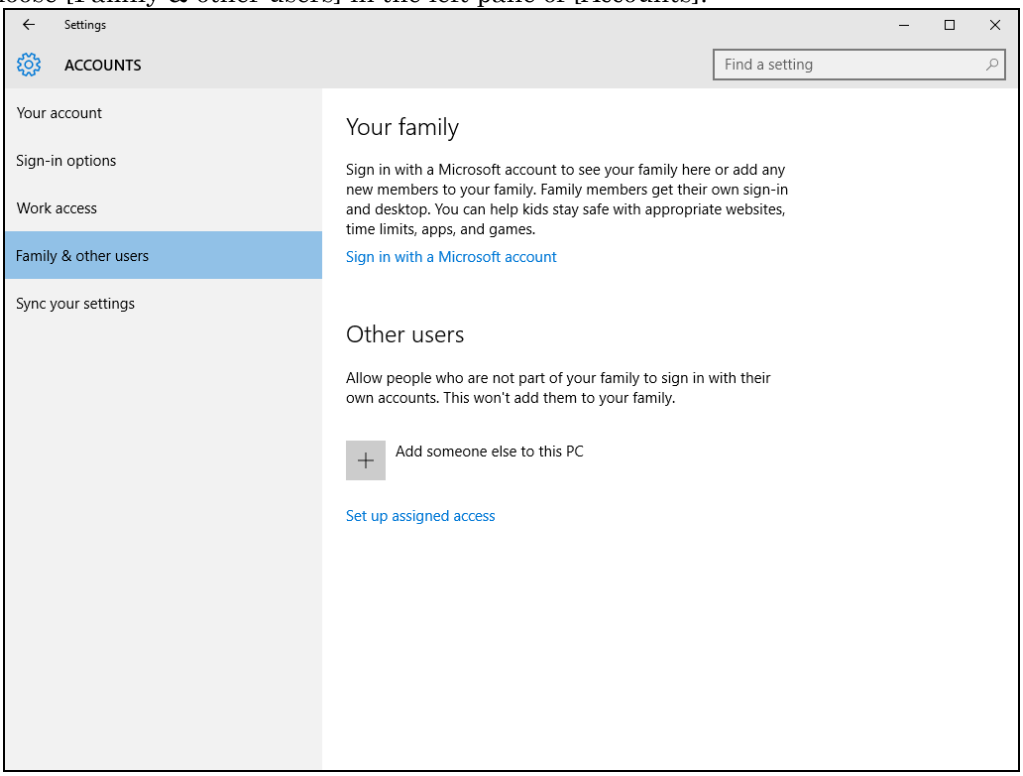
1 Click the start button to open the start menu, then click [Settings] to open it.



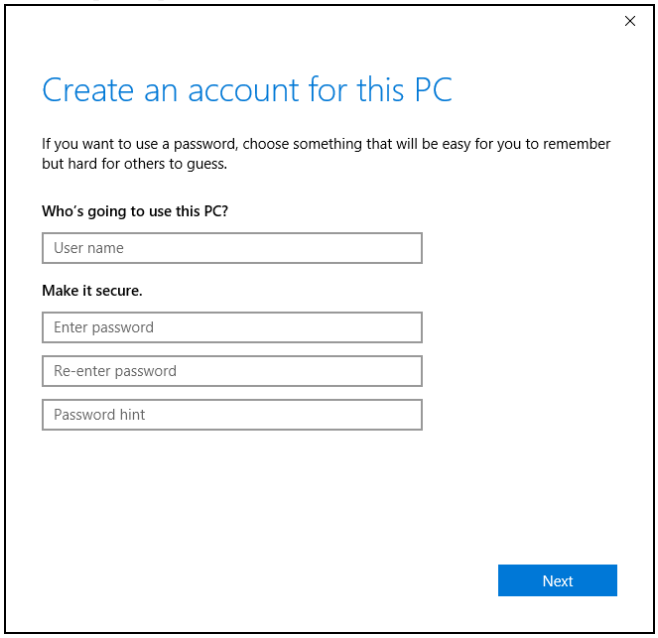
2 Click [Accounts] in [Settings].



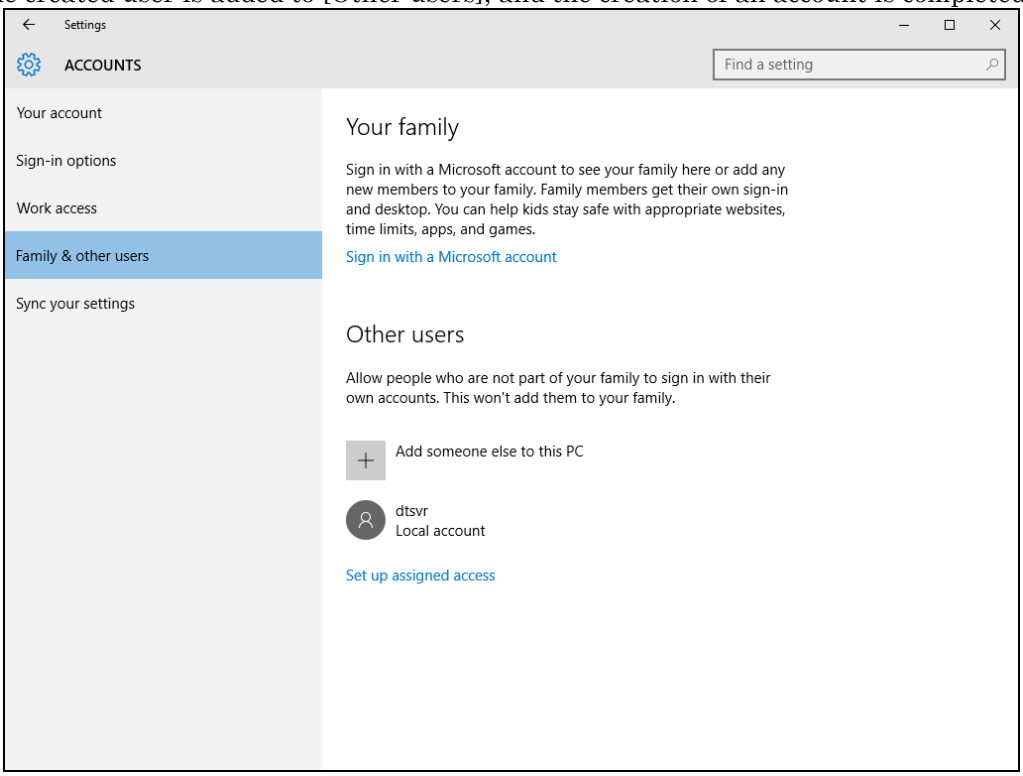
3 Choose [Family & other users] in the left pane of [Accounts].



4 Click [Add someone else to this PC] in [Other users] to open [Create an account for this PC].
Set [User name], [Enter password], [Re-enter password], and [Password hint].
When finished, click the [Next] button.



5 The created user is added to [Other users], and the creation of an account is completed.



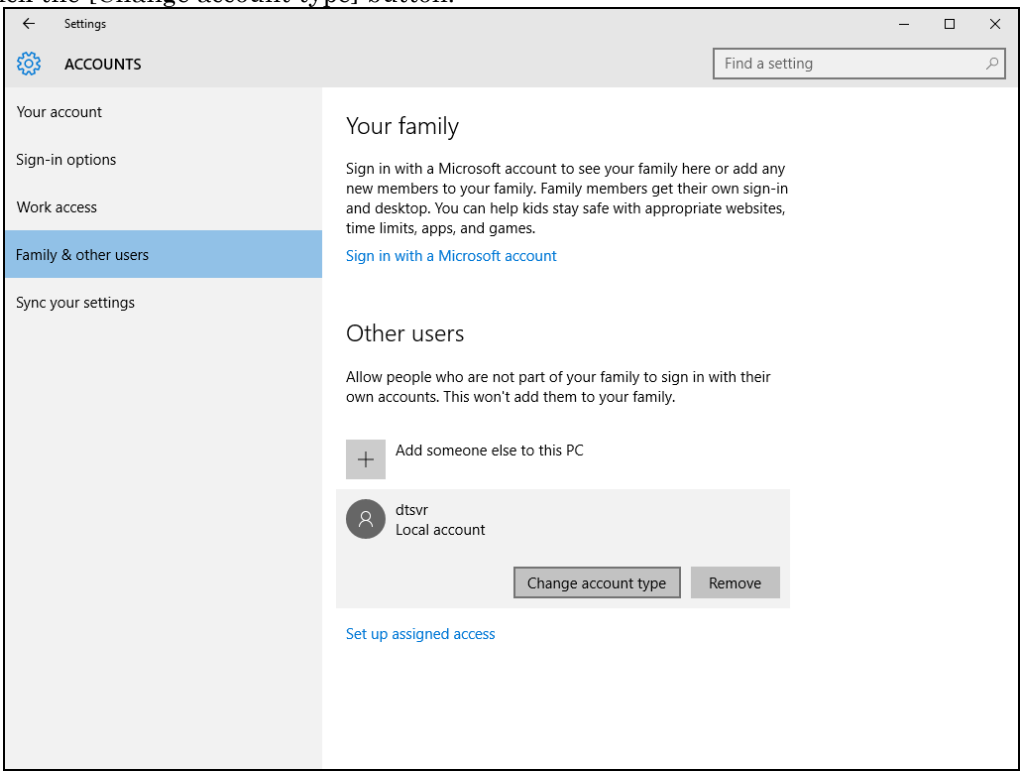
Changing the account type

The user account created as described above is registered as a standard user.
Change the account type to Administrator as required.

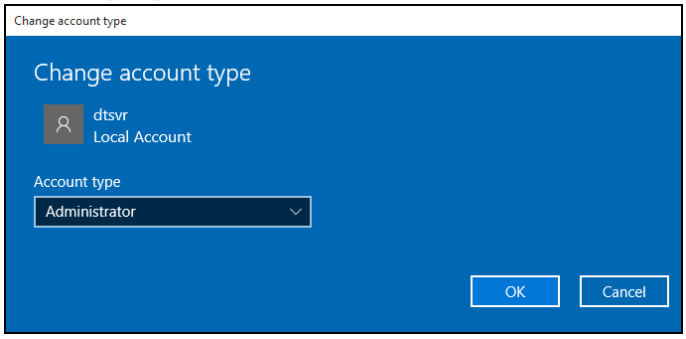
NOTE

If the account type is not to be changed to Administrator, a file may not be able to be read or written with the account. In this case, grant an access right to read and write the home directory set in step 9 in "Setting the Internet Information Service" described above to the user account.

1 Click the user to change the account type. Then the [Change account type] button appears. Click the [Change account type] button.



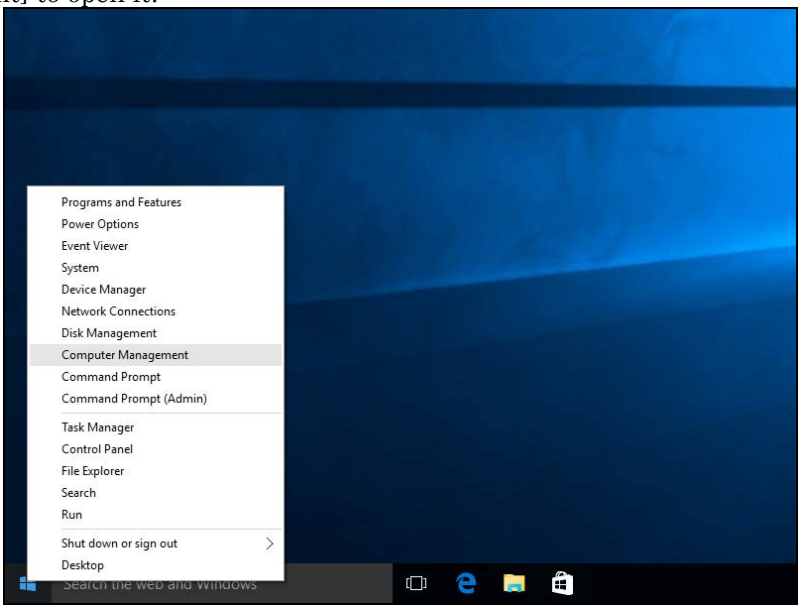
2 Choose [Administrator] from [Account type] drop-down list. When finished, click the [OK] button.



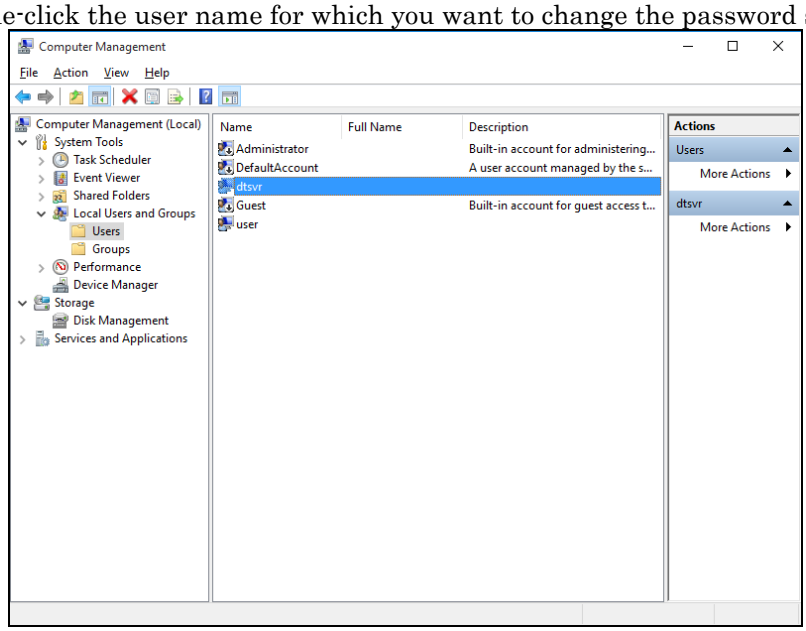
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password. If necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.
The password of the user added by the procedure described before will never be expired by default.

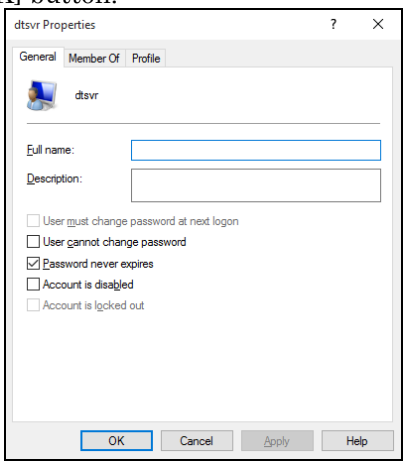
1 Right-click the start button to open the quick access menu, then click [Computer Management] to open it.



2 Choose [Users] in [Local Users and Groups] in the left pane of [Computer Management] to display the user list.
Then double-click the user name for which you want to change the password setting.



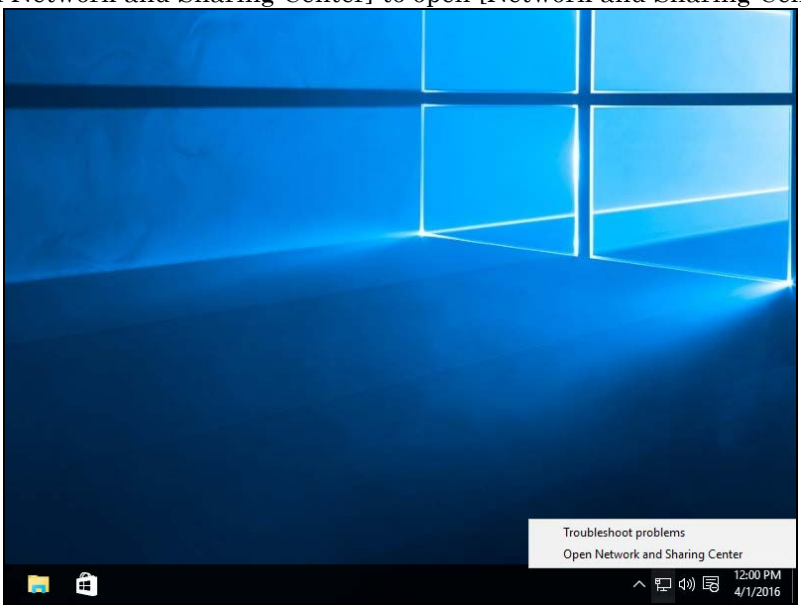
3 Display the [General] property sheet.
Check [Password never expires].
When finished, click the [OK] button.



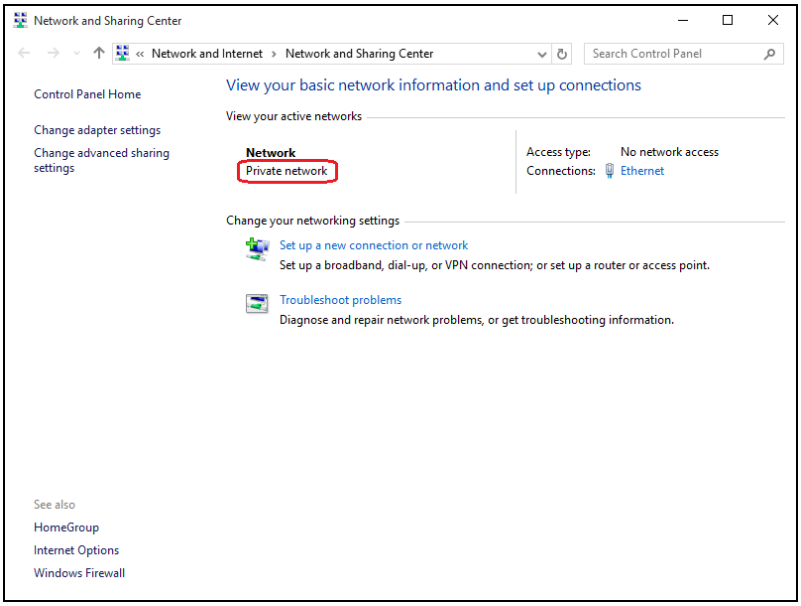
Checking the Windows 10 network

Windows 10 manages networks by network connection location. In addition, it is necessary to set the Windows 10 standard firewall function, which will be described later, by network location type. Before setting the firewall, check the type of network location you use as described below.

1 Right-click the network icon on the task bar.
Click [Open Network and Sharing Center] to open [Network and Sharing Center].



2 The string (in a red circle) displayed under [View your active networks] indicates the network location type. There are three typical types of network locations: Private network, public network and domain network.



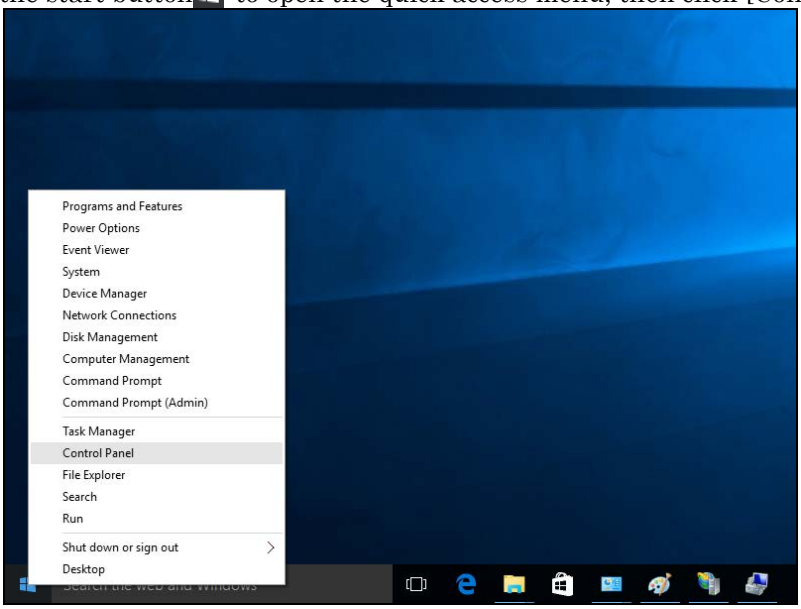
Confirming the Firewall function of Windows 10

Because the Internet Connection Firewall function is included in the Windows 10, the Data Server may not communicate with the FTP server.
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

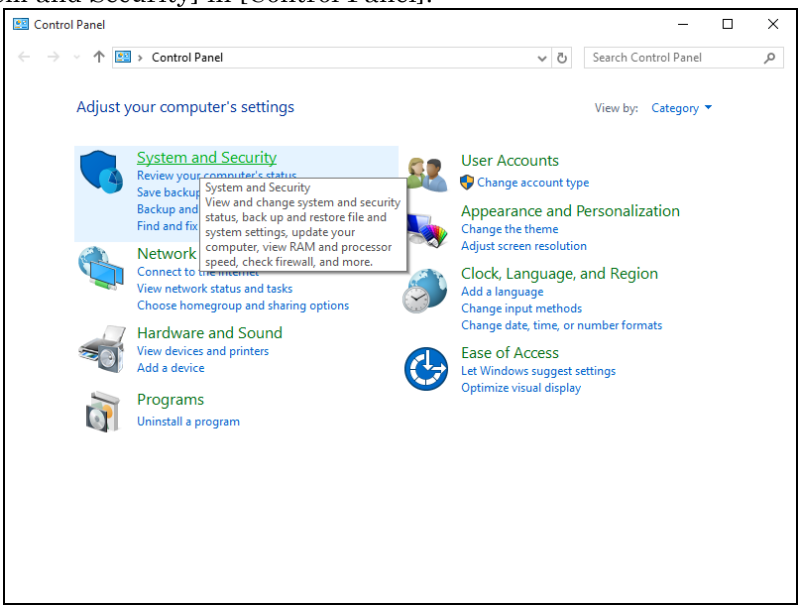
NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.
Therefore, when making the following settings, consult with your network administrator, and take special care.
In some cases, it becomes necessary to isolate the network from the outside as required.

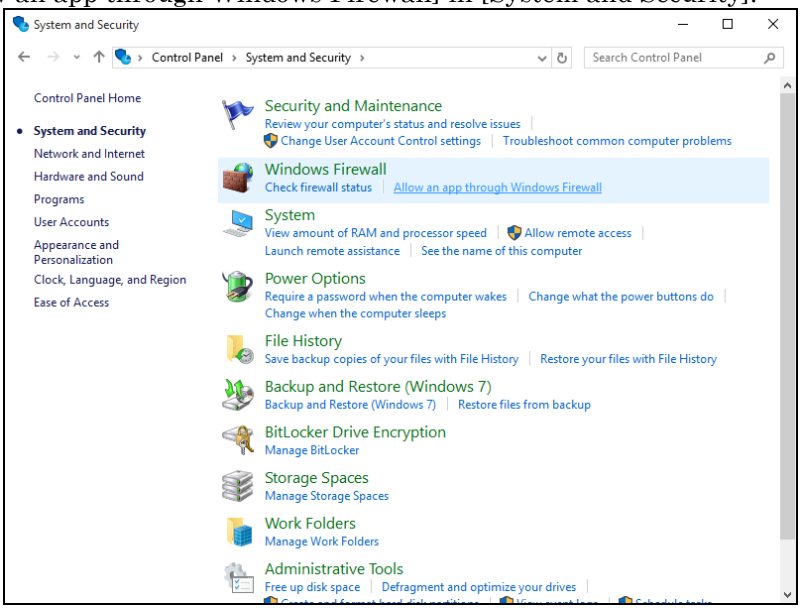
1 Right-click the start button to open the quick access menu, then click [Control Panel].



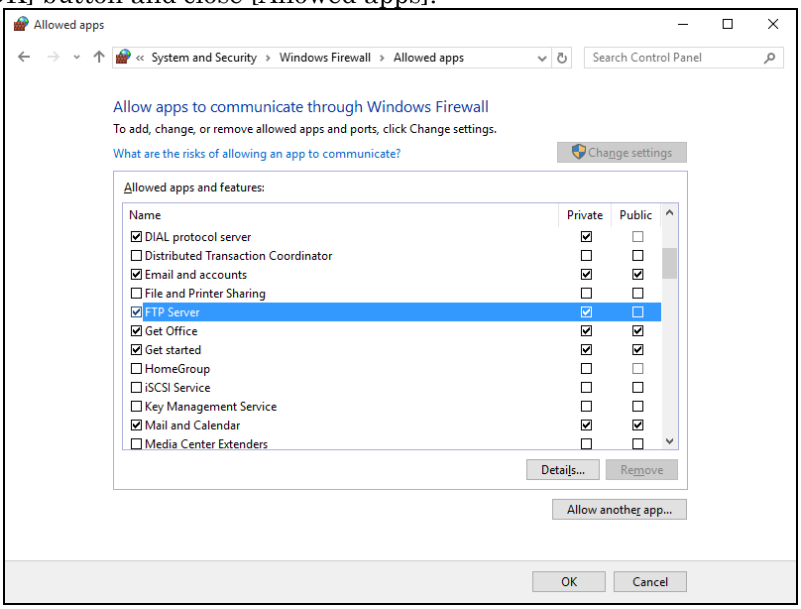
2 Click [System and Security] in [Control Panel].



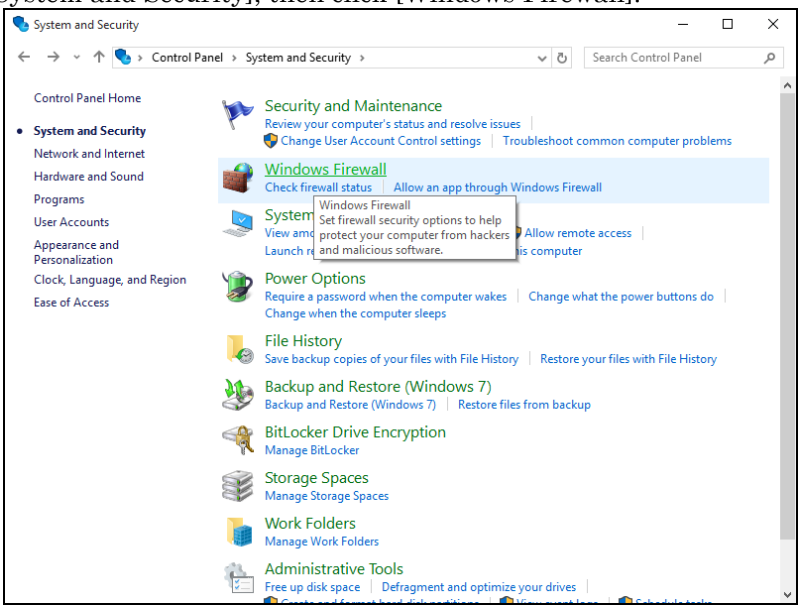
3 Click [Allow an app through Windows Firewall] in [System and Security].



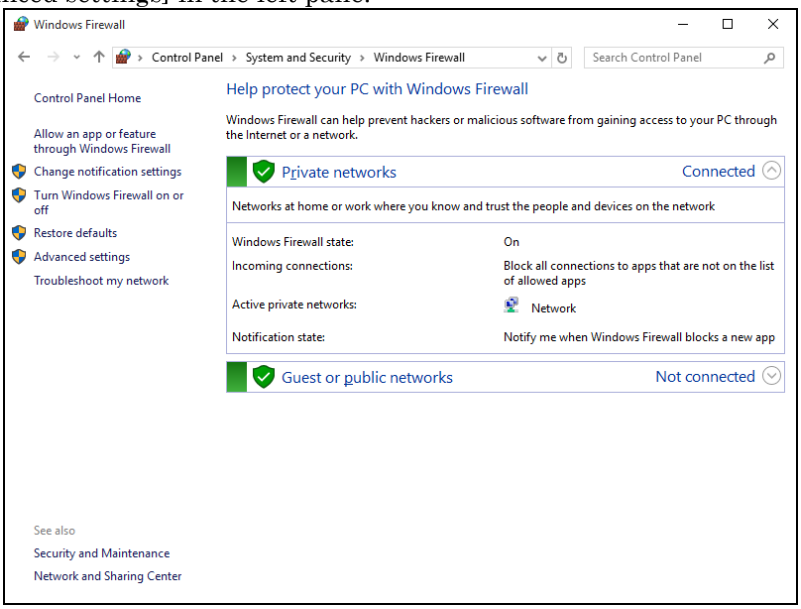
4 Click [Change settings].
Check [FTP Server] and the network location(s) according to the network setting in the [Allowed apps and features] list.
You can check the network location type according to the procedure described in "Checking the Windows 10 network" above.
Click the [OK] button and close [Allowed apps].



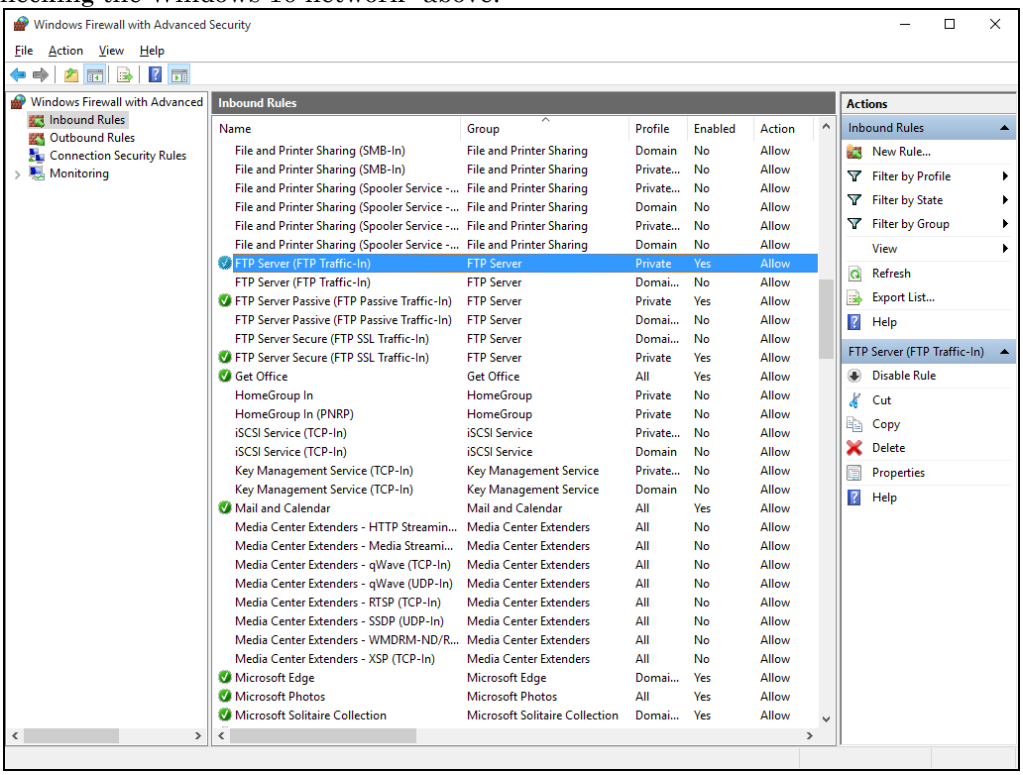
5 Return to [System and Security], then click [Windows Firewall].



6 Click [Advanced settings] in the left pane.



7 Choose [Inbound Rules] in the left pane.
Check if [FTP Server Passive (FTP Passive Traffic-In)], [FTP Server (FTP Traffic-In)], and [File and Printer Sharing (Echo Request - ICMPv4-In)] are enabled.
If those rules are not enable, select them and click [Enable Rule] in right pane.
There are same name rule in [Inbound Rules], but their targets are different network location. The choice of rule to change enabled depend on rule's [Profile] and network location types. You can check the network location type according to the procedure described in "Checking the Windows 10 network" above.



FANUC Series 30*i*/31*i*/32*i* –MODEL B
FANUC Series 0*i*–MODEL F
Inputting the program with comments in Data Server

1. Type of applied technical documents

Name	FANUC Series 30*i*–MODEL A/B FANUC Series 31*i*–MODEL A/B FANUC Series 32*i*–MODEL A/B FANUC Series 35*i*–MODEL B FANUC Power Motion *i*–MODEL A FANUC Series 0*i*–MODEL F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Spec.No./Version	B-64014EN/07

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function	In Data Server function, the function for inputting the program with comments has been added.	Add	Immediately
Unit			
Maintenance parts			
Notice			
Correction			
Another			

APPLIED SOFTWARE

Fast Ethernet software

Model	Series	Edition
Series 30*i*/31*i*/32*i*-MODEL B	658K	21 or later
Series 0*i*-MODEL F	658B	06 or later

The relation between this manual and Fast Ethernet / Fast Data Server OPERATOR'S MANUAL (B-64014EN/07)

This manual	Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Section 2.2, "RELATED NC PARAMETERS"	Merge this Section into Section 2.2, "RELATED NC PARAMETERS" in Part III, "SETTING".
Subsection 1.6.1, "NC Program with Comments Input"	Add this Subsection to Part IV, "OPERATION" as Subsection 1.6.1, "NC Program with Comments Input".

2.2 RELATED NC PARAMETERS

	#7	#6	#5	#4	#3	#2	#1	#0
0000								TVC

[Input type] Setting input
[Data type] Bit path

#0 TVC When a file is transferred from the personal computer to the Data Server, a TV check is:
0: Not performed.
1: Performed.

> **NOTE**
> This parameter is valid only for text files.
> For text files, see Subsection 3.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."

	#7	#6	#5	#4	#3	#2	#1	#0
0100					NCR	CRF	CTV	

[Input type] Setting input
[Data type] Bit

#1 CTV When a file is transferred from the personal computer to the Data Server, character counting for the TV check in program comment parts is:
0: Performed.
1: Not performed.

> **NOTE**
> When bit 0 (DSC) of parameter No. 24309 is set to 1, CTV is enabled in the comment parts after the ';' (semicolon). However, ';' (semicolon) in the program comment part is excluded.

	#7	#6	#5	#4	#3	#2	#1	#0
0908								ISO

[Input type] Setting input
[Data type] Bit

#0 ISO When a Data Server is selected as an I/O device, data input/output is performed using
0: ASCII codes.
1: ISO codes.

> **NOTE**
> This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

	#7	#6	#5	#4	#3	#2	#1	#0
24309								DSC

[Input type] Parameter input
[Data type] Bit

#0 DSC When the program data is input into the Data Server:
0: ';' (semicolon) is not input.
1: Characters from ';' (semicolon) to the end of line are not input.
(The end of line is just before LF, CR or '%'. After the ';' (semicolon) on each line is treated as a comment.)

> **NOTE**
> ';' (semicolon) in the program comment part (enclosed in parentheses) is input.

1 OPERATING THE DATA SERVER FUNCTIONS

1.6.1 NC Program with Comments Input

> **NOTE**
> This operation is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

When bit 0 (DSC) of parameter No. 24309 is set to 1, it possible to add comments to the program data registered in the Data Server. Comment is added and edited on a personal computer etc.

When registering program with comments to the Data Server, the comment is discarded so as not to affect program operation.

Comments can be written in the program from the ';' (semicolon) up to the three characters shown below.

- End of block (LF)
- Carriage return (CR)
- Program code end (%)

Comment parts after the ';' (semicolon) are discarded at Data Server registration, but the ';' (semicolon) in the program comment part (enclosed in parentheses) is left.

Example (program): The reversed part is discarded when registering to the Data Server.

```
% ;O0001
O0001 (SHAFT 01 ;02)
; Comment: Program for machining of work piece 01.
N01G90; Absolute command
N10G01X100.0
M30 ; Program End
%
```

- Leader section (from the beginning to the first End of block 'LF') is discarded.

When registering the program to the Data Server, TV check of the program is executed if bit 0 (TVC) of parameter No. 0000 is set to 1.
TV check counts input program by character. When bit 1 (CTV) of parameter No. 0100 is set to 1, character count of comment part is not implemented.

The followings show the parameter setting pattern that character count is not implemented.

- When bit 0 (TVC) of parameter No. 0000 is set to 1 and bit 0 (DSC) of parameter No. 24309 is set to 1 and bit 1 (CTV) of parameter No. 0100 is set to 1, character count of program comment part (enclosed in parentheses) and comment parts after the ';' (semicolon) is not implemented.

- When bit 0 (TVC) of parameter No. 0000 is set to 1 and bit 0 (DSC) of parameter No. 24309 is set to 0 and bit 1 (CTV) of parameter No. 0100 is set to 1, character count of only program comment part (enclosed in parentheses) is not implemented.

Example (program): Character count is not implemented in the reverse part. (If TVC=1, DSC=1 and CTV=1)

```
M198(COMMENT;12);ABCDE
```

Characters in the table below (ASCII code or ISO code) can be described in the comment parts after the ';' (semicolon).

charactor	ASCII code	ISO code	charactor	ASCII code	ISO code	charactor	ASCII code	ISO code
TAB	09	09	@	40	C0	a	61	E1
SPACE	20	A0	A	41	41	b	62	E2
!	21	21	B	42	42	c	63	63
"	22	22	C	43	C3	d	64	E4
#	23	A3	D	44	44	e	65	65
$	24	24	E	45	C5	f	66	66
&	26	A6	F	46	C6	g	67	E7
'	27	27	G	47	47	h	68	E8
(	28	28	H	48	48	i	69	69
)	29	A9	I	49	C9	j	6A	6A
*	2A	AA	J	4A	CA	k	6B	EB
+	2B	2B	K	4B	4B	l	6C	6C
,	2C	AC	L	4C	CC	m	6D	ED
-	2D	2D	M	4D	4D	n	6E	EE
.	2E	2E	N	4E	4E	o	6F	6F
/	2F	AF	O	4F	CF	p	70	F0
0	30	30	P	50	50	q	71	71
1	31	B1	Q	51	D1	r	72	72
2	32	B2	R	52	D2	s	73	F3
3	33	33	S	53	53	t	74	74
4	34	B4	T	54	D4	u	75	F5
5	35	35	U	55	55	v	76	F6
6	36	36	V	56	56	w	77	77
7	37	B7	W	57	D7	x	78	78
8	38	B8	X	58	D8	y	79	F9
9	39	39	Y	59	59	z	7A	FA
:	3A	3A	Z	5A	5A	{	7B	7B
;	3B	BB	[	5B	DB	|	7C	FC
<	3C	3C	\	5C	5C	}	7D	7D
=	3D	BD	]	5D	DD	~	7E	7E
>	3E	BE	^	5E	DE			
?	3F	3F	`	60	60			

NOTE

'%' cannot be described in the comment parts after the ';' (semicolon).

FANUC Series 30*i*/31*i*/32*i* –MODEL B
FANUC Series 0*i*–MODEL F
Display speed improvement of DATA SERVER HOST FILE LIST screen

1. Type of applied technical documents

Name	FANUC Series 30*i*–MODEL A/B FANUC Series 31*i*–MODEL A/B FANUC Series 32*i*–MODEL A/B FANUC Series 35*i*–MODEL B FANUC Power Motion *i*–MODEL A FANUC Series 0*i*–MODEL F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Spec.No./Version	B-64014EN/07

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function	In Data Server function, the display speed of DATA SERVER HOST FILE LIST screen has been improved.	Add	Immediately
Unit			
Maintenance parts			
Notice			
Correction			
Another			

Edit	Date	Design	Description
Date	23-Feb-2018	Design	Ikki
		Apprv.	

Title	FS30i/31i/32i–B, FS0i–F Display speed improvement of DATA SERVER HOST FILE LIST screen
Draw No.	**B-64014EN/07-3**
FANUC CORPORATION	Sheet 1/6

APPLIED SOFTWARE

Fast Ethernet software

Model	Series	Edition
Series 30*i*/31*i*/32*i*-MODEL B	658K	21 or later
Series 0*i*-MODEL F	658B	06 or later

The relation between this manual and Fast Ethernet / Fast Data Server OPERATOR'S MANUAL (B-64014EN/07)

This manual	Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Section 2.2, "RELATED NC PARAMETERS"	Merge this Section into Section 2.2, "RELATED NC PARAMETERS" in Part III, "SETTING".
Subsection 1.3.1.1, "Display speed improvement of DATA SERVER HOST FILE LIST screen"	Add this Subsection to Part IV, "OPERATION" as Subsection 1.3.1.1, "Display speed improvement of DATA SERVER HOST FILE LIST screen".

2 SETTING THE DATA SERVER FUNCTIONS

2.2 RELATED NC PARAMETERS

0928	Cache validity period of Data Server Host File List information

[Input type] Parameter input
[Data type] Word
[Unit of data] min
[Valid data range] -1, 0 to 100

NOTE
1 This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.
2 When this parameter is set, the power must be turned off.

Specify the cache validity period of Data Server Host File List information in minutes. When the display operation is performed after the validity period expires, the file information is read again and updated.
When this parameter is set to 0, the cache is disabled.
When this parameter is set to -1, the cache is enabled and the validity period is unlimited. The cache will not be updated until display update operation is performed.
If less than -1 is specified, it assumed to be -1, and if more than 100 is specified, it assumed to be 100.

	#7	#6	#5	#4	#3	#2	#1	#0
11364		FLC						

[Input type] Parameter input
[Data type] Bit

#6 FLC On the program folder screen, when the program folder screen is displayed again after the screen switching, path switching and the device switching are done:
0: The cursor position moves to the head of the folder.
1: The cursor position stays at original position.

NOTE
1 This function is available from the cursor position in the program folder screen displayed after this parameter is set to 1.
2 When parameter No. 0928 is set to other than 0, information in the cache is displayed on the DATA SERVER HOST FILE LIST screen. For that reason, it may be different from the list information in the host computer.

1.3.1.1 Display speed improvement of DATA SERVER HOST FILE LIST screen

NOTE
This operation is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

When parameter No. 0928 is set to other than 0, the file information obtained from the host computer is cached in the internal memory. By using this cache from the next time on, display and search operation in the DATA SERVER HOST FILE LIST screen will be speeded up.
The number of files / folders in cache is as follows.

Display mode	Maximum number of files / folders
DETAIL OFF mode	12,656 files / folders
DETAIL ON mode	10,000 files / folders

When displaying or searching the file information not saved in the cache, it may take a while because the file information is re-read.
The maximum number of characters specified by the search operation is as follows. When caching is enabled, the maximum number of characters is less than when caching is disabled.

Display mode	Maximum number of characters in search	
	Cache disabled	Cache enabled
DETAIL OFF mode	127 characters	126 characters
DETAIL ON mode	127 characters	31 characters

The cache validity period of Data Server Host File List information is set with parameter No. 0928. When the display operation is performed after the specified period has elapsed since the cache was last updated, the reading-process of the file information is executed again.

The cache is updated if the following operation is performed.

When the following operation is performed in the DATA SERVER HOST FILE LIST screen
- Setting change of DETAIL OFF / DETAIL ON
- CREATE FOLDER
- DELETE
- RENAME
- HOST CHANGE
- F OUTPUT
- REFRESH

When the following operation is performed in the DATA SERVER FILE LIST screen
- PUT
- MPUT
- LIST-PUT

NOTE

In the following conditions, the cursor position will be moved to the first position only and the cache is no updated even if the display update operation is performed. In this case, perform the display update operation again.

- When DETAIL OFF mode and start position of file / folder display is the second or more, and is ("the number of items displayed on one page" + 1)th or less.

- When DETAIL ON mode and start position of file / folder display is the second or more, and is (twice "the number of items displayed on one page" + 1)th or less.

In particular, as shown in the figure below, when DETAIL OFF mode and the number of items displayed per page is 10, the screen display is updated in (1) and (4), and it is not updated in (2) and (3).

(1)	(2)	(3)	(4)
O0001	O0001	O0001	O0001
O0002	O0002	O0002	O0002
:	:	:	:
O0010	O0010	O0010	O0010
O0011	O0011	O0011	O0011
O0012	O0012	O0012	O0012
:	:	:	:
O0020	O0020	O0020	O0020
O0021	O0021	O0021	O0021
:	:	:	:

FANUC Series 30*i*/31*i*/32*i* –MODEL B
FANUC Series 0*i*–MODEL F
Support data erasure in the Data Server

1. Type of applied technical documents

Name	FANUC Series 30*i*–MODEL A/B FANUC Series 31*i*–MODEL A/B FANUC Series 32*i*–MODEL A/B FANUC Series 35*i*–MODEL B FANUC Power Motion *i*–MODEL A FANUC Series 0*i*–MODEL F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Spec.No./Version	B-64014EN/07

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function	In Data Server function, when the memory card built into the Data Server is formatted, the function to format after writing a stream of zeros data onto all areas of the memory card has been supported.	Add	Immediately
Unit			
Maintenance parts			
Notice			
Correction			
Another			

APPLIED SOFTWARE

Fast Ethernet software

Model	Series	Edition
Series 30*i*/31*i*/32*i*-MODEL B	658K	22 or later
Series 0*i*-MODEL F	658B	07 or later

The relation between this manual and Fast Ethernet / Fast Data Server OPERATOR'S MANUAL (B-64014EN/07)

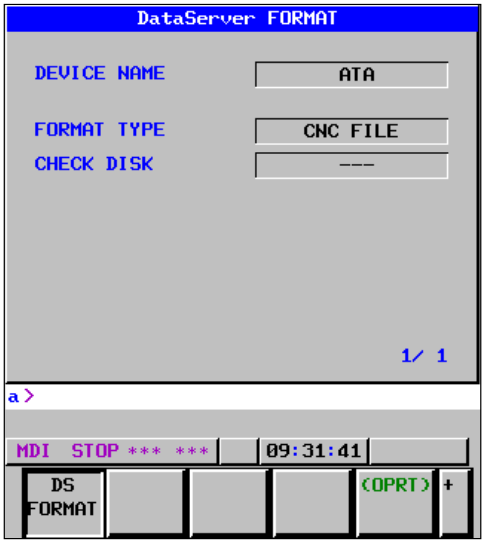
This manual	Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Section 2.1, "OPERATING THE DATA SERVER SETTING SCREEN"	Replace this Section into "Data Server FORMAT screen" of Section 2.1, "OPERATING THE DATA SERVER SETTING SCREEN" in Part III, "SETTING".
Section 2.2, "RELATED NC PARAMETERS"	Merge this Section into Section 2.2, "RELATED NC PARAMETERS" in Part III, "SETTING".

2 SETTING THE DATA SERVER FUNCTIONS

2.1 OPERATING THE DATA SERVER SETTING SCREEN

Data Server FORMAT screen

Press soft key [DS FORMAT] to display the format screen of the memory card built into the Data Server.



Data Server FORMAT screen

When the memory card is formatted, it has been possible to select whether perform data erasure or not. (For the Series 30*i*/31*i*/32*i*-B, Series 0*i*-F)
When it is necessary to perform data erasure for safety reasons such as the NC program management, set the bit 7 (CLR) of parameter No. 0907 to 1, then perform the format.
If bit 7 (CLR) of parameter No. 0907 is set to 1, a stream of zeros data is written onto all areas of the memory card, then the format is performed.
If bit 7 (CLR) of parameter No. 0907 is set to 0, the normal format is performed. In this case, there is a possibility that the contents of the deleted file is left on the memory card.

NOTE

1 The time required to perform data erasure of the memory card depends on the capacity of the memory card. Estimated processing time is as follows.

Name	Specification	Estimated processing time
CompactFlash card (128MB)	A02B-0281-K601	1 minute
CompactFlash card (256MB)	A02B-0213-K211	2 minutes
CompactFlash card (1GB)	A02B-0213-K212	5 minutes
CompactFlash card (2GB)	A02B-0213-K213	10 minutes
CompactFlash card (4GB)	A02B-0213-K214	20 minutes
CompactFlash card (16GB)	A02B-0213-K216	70 minutes

2 While performing data erasure of the memory card, the CNC cannot be operated and cannot be turned off until it is completed. And the processing cannot be canceled halfway.

Display item

Item	Description
DEVICE NAME	Indicates the storage media currently being used by the Data Server. "ATA" or "NONE" is indicated. ATA : A memory card is mounted. None : No memory card is mounted.
FORMAT TYPE	Indicates the format type of the memory card. "CNC FILE" or "---" is displayed. When "---" is displayed, check whether the memory card is mounted properly and is formatted correctly.
CHECK DISK	Indicates the check result. When no check is made : "-----" When the check result is normal : "OK" When the check result is abnormal : "NG"

Procedure (CHECK DISK)

1 Press soft key [(OPRT)] then soft key [CHECK DISK].

2 Press soft key [EXEC] to check the format of the memory card and display the check result.

⚠ CAUTION

If the check result is abnormal, determine the cause of trouble from an error message displayed on the ETHERNET LOG screen and back up the files stored on the memory card immediately. Then, try to reformat the memory card.

NOTE

1 An error occurs if other Data Server functions are operated when a check disk is made.

2 Also when a program on the memory card of the Data Server is selected as a main program, the check disk operation cannot be performed.

Procedure (CNC FORMAT)

1 Press soft key [(OPRT)] then soft key [CNC FORMAT].

2 Press soft key [EXEC] to format the memory card built into the Fast Data Server.

> ⚠ **CAUTION**
> 1 Do not turn off the power to the CNC when the memory card is being formatted. Otherwise, the memory card can be damaged.
> 2 When the memory card is formatted, all files held on the memory card are erased.

> **NOTE**
> 1 An error occurs if other Data Server functions are operated when the memory card is formatted.
> 2 Also when a program on the memory card of the Data Server is selected as a main program, the memory card cannot be formatted.

2.2 RELATED NC PARAMETERS

	#7	#6	#5	#4	#3	#2	#1	#0
0907	CLR							

[Input type] Parameter input
[Data type] Bit

#7 CLR When the memory card built into the Data Server is formatted, data erasure process that write a stream of zeros data onto all areas of the memory card is:
0: Not performed.
1: Performed.

> **NOTE**
> This parameter is only available with the Series 30*i*/31*i*/32*i*-B and Series 0*i*-F.

FANUC Series 30*i*/31*i*/32*i* –MODEL B
FANUC Series 0*i*–MODEL F
Support 32GB built-in memory card in the Data Server

1. Type of applied technical documents

Name	FANUC Series 30*i*–MODEL A/B FANUC Series 31*i*–MODEL A/B FANUC Series 32*i*–MODEL A/B FANUC Series 35*i*–MODEL B FANUC Power Motion *i*–MODEL A FANUC Series 0*i*–MODEL F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Spec.No./Version	B-64014EN/07

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function	In Data Server function, 32GB built-in memory card has been supported.	Add	Immediately
Unit			
Maintenance parts			
Notice			
Correction			
Another			

Edit	Date	Design	Description

Date	14-Jun-2018	Design	Ikki	Apprv.

Title	FS30i/31i/32i–B, FS0i–F Support 32GB built-in memory card in the Data Server
Draw No.	**B-64014EN/07-5**
FANUC CORPORATION	Sheet 1/4

APPLIED SOFTWARE

Fast Ethernet software

Model	Series	Edition
Series 30*i*/31*i*/32*i*-MODEL B	658K	23 or later
Series 0*i*-MODEL F	658B	08 or later

The relation between this manual and Fast Ethernet / Fast Data Server OPERATOR'S MANUAL (B-64014EN/07)

This manual	Fast Ethernet / Fast Data Server OPERATOR'S MANUAL
Subsubsection 1.2.2.4, "Installing a memory card"	Replace this Subsubsection into Subsubsection 1.2.2.4, "Installing a memory card" in Part V, "CONNECTION".

1 SETTING

1.2 Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A AND Series 0*i*-F

1.2.2 Installation

1.2.2.4 Installing a memory card

The following shows the specifications of memory cards recommended as an external storage device of the Fast Ethernet board.

Specification	Capacity	Remarks
A02B-0281-K601	128MB	Compact Flash card
A02B-0213-K211	256MB	Compact Flash card
A02B-0213-K212	1GB	Compact Flash card
A02B-0213-K213	2GB	Compact Flash card
A02B-0213-K214	4GB	Compact Flash card
A02B-0213-K216	16GB	Compact Flash card
A02B-0213-K217	32GB	Compact Flash card

NOTE

1 Use a FANUC-recommended memory card for the Data Server.
Follow the instructions described in “Note for using this card” supplied with a memory card.

2 For latest information, refer to the Technical Report provided separately.

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REVISION RECORD

Edition	Date	Contents
07	Sep., 2015	• Addition of Series 0*i*-F • Correction of errors
06	Mar., 2014	• Addition of warnings to "Safety Precautions" • Correction of errors
05	Mar., 2013	• Addition of Power Motion *i*-A • Addition of the ISO code input/output function to the Data Server functions and FTP file transfer function • Addition of file operation between the Data Server and USB memory • Correction of errors
04	Nov., 2010	• Addition of Series 30*i*/31*i*/32*i*/35*i*-B • Addition of unsolicited messaging function and ftp file transfer function • Correction of errors
03	Aug., 2005	• Addition of such as NC program input/output on the Data Server functions • Correction of errors
02	Sep., 2004	• Addition of the machine remote diagnosis function • Addition of the Series 31*i*/310*i*-A, 32*i*/320*i*-A • Correction of errors
01	Sep., 2003	

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