NEC Express Server
Express5800 Series

NEC

Express5800 Series

FC Array Mode Auto-Changeover Tool
Ver.1.00

User's Guide

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Preface

This guide explains how to install FC Array Mode Auto-Changeover Tool and its functions that changes the mode of Fibre Channel Disk Array Unit (ST12000) (hereinafter, described “FC Array”) on the Express5800 series.

FC Array Mode Auto-Changeover Tool should be installed in a server connected with FC Array.

Besides, Global Array Manager (hereinafter, described “GAM”) is required to enable the functions of FC Array Mode Auto-Changeover Tool. As for the features of GAM, see “Global Array Manager Ver.4.00/5.00 Installation Manual”, “Global Array Manager Ver.5.00 Installation Manual (Linux Server Edition)” or “Global Array Manager Ver.4.00/5.00 Operation Manual”.

The readers of this manual are required to be familiar with the functions and operations of Windows 2000, Windows NT or Linux. Refer to the online help of each OS for the operations and unknown information on Windows 2000, Windows NT or Linux.
See the publications provided with FC Array for the information specific to it.

Text Conventions

The following conventions are used throughout this guide.

Note Items that are mandatory or require attention when using the utilities and the equipments.

Tips Helpful and convenient piece of information.

Contents

1.Overview

On a system with FC Array, if the power of FC Array is turned off when a server is being down, cached data in the cache memories (hereinafter, described “cache”) of RAID controllers may be lost because of the power off before the data is flushed completely. Hence, it is required so far to change the mode of FC Array manually from Normal Operation Mode to Shutdown Mode before its power is turned off.

FC Array Mode Auto-Changeover Tool is a service application which changes RAID controllers to Normal Operation Mode / Shutdown Mode automatically when a server starts or be down, and actualizes the labor-saving of the preceding manual operation and to prevent cached data from loss.

1.1. Modes of FC Array

FC Array works on 2 modes.

- Shutdown Mode

The mode to disable caching function of caches, and to write data onto logical drives at Write Through state.

- Normal Operation Mode

The mode to enable caching function of caches, and to write data onto logical drives at Write Back state.

Note
- **If caches are originally set Write Through state, caches continue to behave at Write Through state.**
- **If OS (services) should be started after caches change to Write Through state by errors in FC Array, caches continue to behave at Write Through state.**

1.2. Major Functions

FC Array Mode Auto-Changeover Tool has 3 functions.

- “Prepare for Shutdown” Function

If FC Array is at Normal Operation Mode when OS is being down, FC Array Mode Auto-Changeover Tool changes RAID controllers to Shutdown Mode.

Tips The publications such as “Fibre Channel Disk Array (ST12000) Setup Manual”, etc. recommend to do “Prepare for Shutdown” operation by SAM Client and change to Shutdown Mode before the power-off of FC Array. However, this operation is no longer necessary owing to this function.

- “Return to Normal Operation” Function

If FC Array is at Shutdown Mode when OS (services) is started and during a server is running, FC Array Mode Auto-Changeover Tool changes RAID controllers to Normal Operation Mode.

Tips Even if the mode is changed to Shutdown Mode by “Prepare for Shutdown” operation on SAM Client during a server is running, it returns automatically to Normal Operation Mode. To disable this feature, stop FC Array Mode Auto-Changeover Tool service, then do “Prepare for Shutdown” operation on SAM Client.

- “Event Log Registration” Function

FC Array Mode Auto-Changeover Tool registers event messages in Event Log when each event occurs.

Note - **The mode of FC Array never be changed over automatically during FC Array Mode Auto-Changeover Tool service is stopped.**

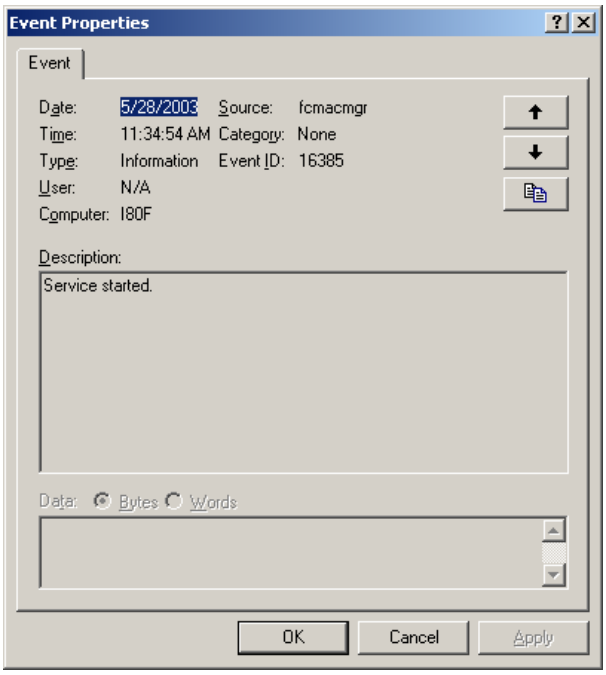
- **On cluster systems, even if a changeover between Shutdown Mode and Normal Operation Mode occurs on one server, its event message never be registered in Event Log on another server.**
- **On cluster systems, if OS is shut down on one server, FC Array enters and keeps Shutdown Mode till it returns to Normal Operation Mode by FC Array Mode Auto-Changeover Tool on another server.**
  The interval till FC Array returns to Normal Operation Mode may be adjusted by configuration of Interval to Check FC Array Mode (ID: Interval) in the configuration file.

1.3. Event Messages

1.3.1 How to Verify Event Messages

On Windows Edition, event messages registered by FC Array Mode Auto-Changeover Tool can be verified by [Administrative Tools] - [Event Viewer]. (See the right picture.)

As for the event messages which have failed to be registered in Event Log, they can be verified by referring the log file “fcmacmgr.log”, which exists under the installed folder, by a text editor.



On Linux Edition, open the system log file /var/log/messages by vi editor, etc., and verify event messages registered by FC Array Mode Auto-Changeover Tool. Event messages are registered in the system log file with the following format.

```
Jun 16 13:40:03 server fcmacmgrd[1641]: <ID=4001> Daemon started.
Jun 16 13:41:03 server fcmacmgrd[1644]: <ID=4005> FC array mode auto-changeover function is enabled at present.
      ..............
```

1.3.2 Contents of Event Messages

FC Array Mode Auto-Changeover Tool registers the following messages in Event Log.

[Message Table]

ID	Type	Contents on Windows	Contents on Linux
		Cause/Disposal	
16385 (0x4001)	Info.	Service started.	Daemon started.
		_	
16386 (0x4002)	Info.	Service stopped.	Daemon stopped.
		_	
16387 (0x4003)	Info.	FC array entered shutdown mode.	
		_	
16388 (0x4004)	Info.	FC array entered normal operation mode.	
		_	
16389 (0x4005)	Info.	FC array mode auto-changeover function is enabled at present.	
		_	
32774 (0x8006)	Warn.	FC array mode auto-changeover function is disabled at present.	
		Either of the errors below occurred. Do the appropriate disposal, and restore the system to the normal operation state.	
32769 (0x8001)	Warn.	INI file xxxx is not found. Service will work with default settings. (*1)	Config. file xxxx is not found. Daemon will work with default settings. (*1)
		Check whether the configuration file exists on the appropriate location. (*1)	
32770 (0x8002)	Warn.	Invalid wait time xx to check FC array mode at first. Service will work with default time. (*2)	Invalid wait time xx to check FC array mode at first. Daemon will work with default time. (*2)
		Check the contents of configuration file. (*1)	
32771 (0x8003)	Warn.	Invalid interval xx to check FC array mode. Service will work with default interval. (*2)	Invalid interval xx to check FC array mode. Daemon will work with default interval. (*2)
		Check the contents of configuration file. (*1)	
32772 (0x8004)	Warn.	Invalid timeout value xx to await devices opened. Service will work with default timeout. (*2)	Invalid timeout value xx to await devices opened. Daemon will work with default timeout. (*2)
		Check the contents of configuration file. (*1)	
32773 (0x8005)	Warn.	Invalid retrial times xx to await devices opened. Service will work with default timeout. (*2)	Invalid retrial times xx to await devices opened. Daemon will work with default timeout. (*2)
		Check the contents of configuration file. (*1)	
49153 (0xC001)	Error	Starting/stopping service failed.	Starting/stopping daemon failed
		The service could not be started/stopped due to an functional error. Restart the service, or reboot the system using FC Array.	

**) On Linux Edition, ID of each event is registered as hexadecimal number.

*1) The path name of configuration file is ”(Installed folder name)/fcmacmgr.ini" on Windows, and “/etc/fcmacmgr.conf” on Linux. Either of them is registered in “xxxx” according to OS model.

*2) Configured values (charactors) are registered in “xx”.

[Message Table] (Sequel)

ID	Type	Contents on Windows	Contents on Linux
		Cause/Disposal	
33025 (0x8101)	Warn.	FC array information is unknown.	
		The information of FC Array could not be retrieved. Check the status of the server.	
33026 (0x8102)	Warn.	FC array mode changeover operation failed.	
		The mode of FC Array could not be changed. Check the status of the server.	
33027 (0x8103)	Warn.	FC array mode was not returned.	
		The information of FC Array could not be retrieved. Check the status of the server.	
33028 (0x8104)	Warn.	FC array mode changed to the same.	
		The mode of FC Array could not be changed. Check the status of the server.	
49409 (0xC101)	Error	GAM Server service status is unknown.	GAM driver daemon status is unknown.
		The status of GAM Server service/GAM driver daemon could not be retrieved. Check the status of the server.	
49410 (0xC102)	Error	GAM Server service is stopped.	GAM driver daemon is stopped.
		Start GAM Server service/GAM driver daemon.	
33281 (0x8201)	Warn.	No RAID controller in FC array was found.	
		Check the connection between FC Array and the server, or do the status of RAID controllers.	
49665 (0xC201)	Error	No device file could be opened.	
		Check the connection between FC Array and the server, or do the status of RAID controllers.	

**) On Linux Edition, ID of each event is registered as hexadecimal number.

2.Setup for Windows Edition

2.1. Required Environment

This section describes the environment required for FC Array Mode Auto-Changeover Tool.

■ **Hardware**

- Main computer : Express 5800 series connected with FC Array
- Unused space in hard disk : 1MB or larger (+ 5MB or larger for installation)

■ **Software**

- Windows NT
- Windows 2000
- Fibre Channel Disk Array Controller Driver
- GAM Server 4.00/5.00

Tips The version of GAM Server can be checked by [Control Panel] - [Add or Remove Program].

2.2. Installation

2.2.1 Preparation

The following preparations are required to install FC Array Mode Auto-Changeover Tool.

- Available pointing devices such as a mouse or others
- Logged-in as Administrators group
- Installed GAM Server

Note
- **If GAM Server is not installed, install GAM Server before FC Array Mode Auto-Changeover Tool's installation.**
- **If GAM Server is upgraded or downgraded, FC Array Mode Auto-Changeover Tool requires to be re-installed.**

2.2.2 How to Install

This section describes how to install FC Array Mode Auto-Changeover Tool.
Install FC Array Mode Auto-Changeover Tool according to the following procedure.

1) Start the setup program.

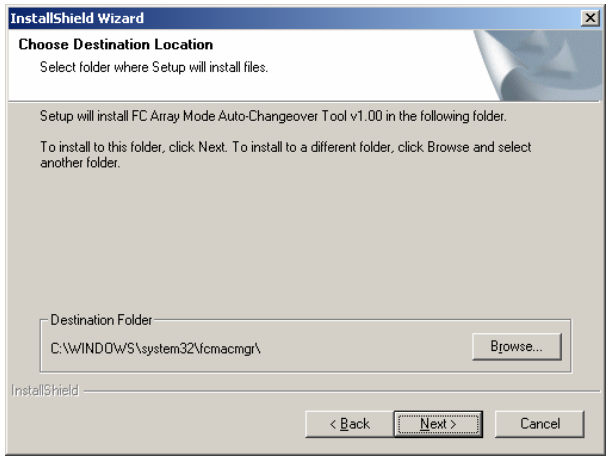
[Choose Destination Location] dialog box will appear.

Tips There are 2 ways to start the setup program.

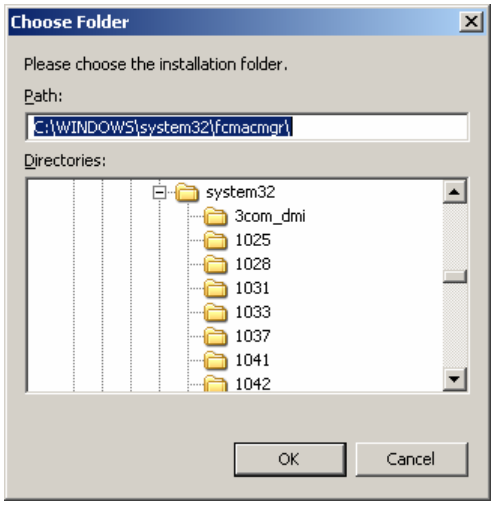
- WWW (World Wide Web) Edition
  Start the downloaded setup program.
- CD-ROM Edition
  Start the setup program under “FCMACMGR” folder contained the CD-ROM which is attached with FC Array.

2) Verify the destination folder name, and click [Next] button.

Installation will start, and [Start Copying Files] dialog box will appear.

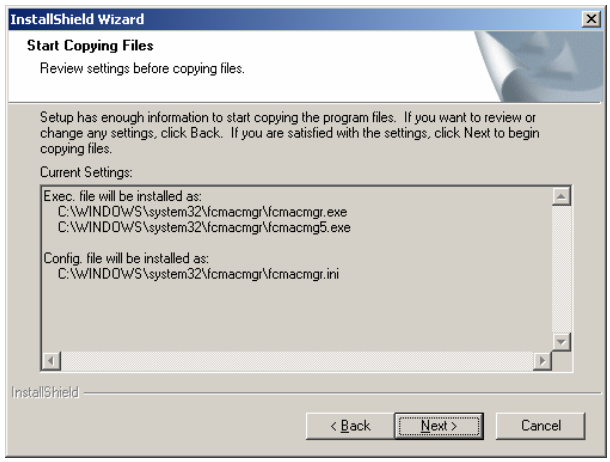


Tips To refer and change the destination folder, click **[Browse...]** button to show **[Choose Folder]** dialog box, and select another preferable folder.



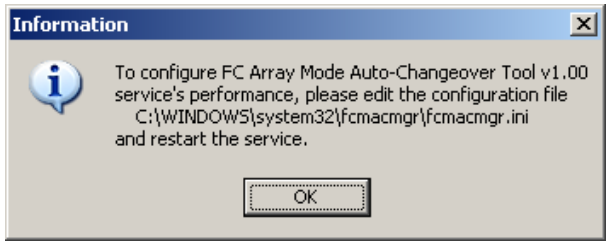
3) **Verify the files to be copied, and click [Next] button.**

Installation will start.

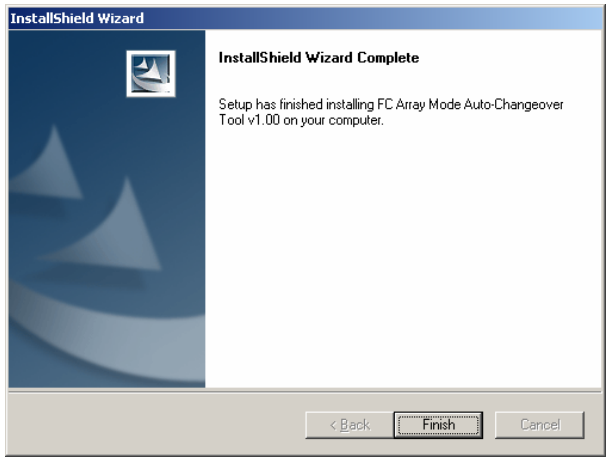


4) **Click [OK] button.**

[InstallShield Wizard Comlete] dialog box will appear.



5) **Click [Finish] button.**



Now installation is over.

According to your requirements, refer “Environment Setting” mentioned later, and change the behavior of FC Array Mode Auto-Changeover Tool.

2.3. Uninstallation

2.3.1 How to Uninstall

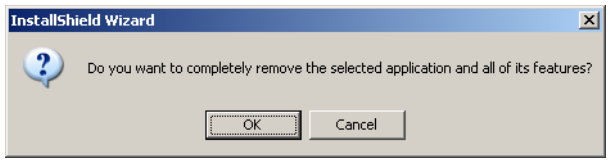
Uninstall FC Array Mode Auto-Changeover Tool according to the following procedure.

1) **Start [Add or Remove Program] on Control Panel, and select "FC Array Mode Auto-Changeover Tool" on [Add or Remove Program] dialog box, then click [Add/Remove] button.**

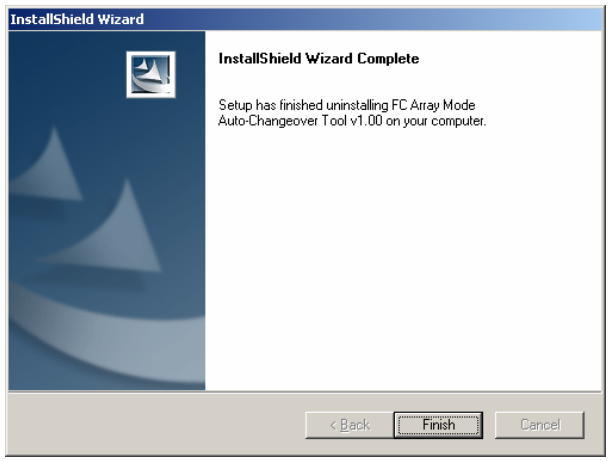
   A dialog box to verify if the application and all features need to be removed will appear.

2) **Click [OK] button.**

   Uninstallation will start, and [InstallShield Wizard Comlete] dialog box will appear.



3) **Click [Finish] button.**



Now uninstallation is over.

3.Setup for Linux Edition

3.1. Required Environment

This section describes the environment required for FC Array Mode Auto-Changeover Tool.

■ **Hardware**

- Main computer : Express 5800 series connected with FC Array
- Unused space in hard disk : 1MB or larger

■ **Software**

- Red Hat Linux 7.2/7.3
- Miracle Linux Standard Edition 2.0/2.1
- Red Hat Linux Advanced Server 2.1 powered by Miracle
- Red Hat Enterprise Linux AS/ES 2.1/3.0
- Linux for NEC Express5800/ft series
- Fibre Channel Disk Array Controller Driver
- GAM Server 5.00

Tips Input the following command, and check the version of GAM Server.

```
# rpm -qi gam-server
```

3.2. Installation

3.2.1 Preparation

The following preparations are required to install FC Array Mode Auto-Changeover Tool.

- Logged-in as root user
- Installed GAM Server

Note – **Do not install plural FC Array Mode Auto-Changeover Tool packages.**
– **If GAM Server is not installed, install GAM Server before FC Array Mode Auto-Changeover Tool's installation.**

3.2.2 How to Install

This section describes how to install FC Array Mode Auto-Changeover Tool.
If FC Array Mode Auto-Changeover Tool has been already installed, the installed one is still available.

Tips Input the following command, and check the installed FC Array Mode Auto-Changeover Tool.

```
# rpm -qi fcmac
```

Verify the downloaded RPM file by ls command, then input the following command to install FC Array Mode Auto-Changeover Tool.

```
# rpm -iv fcmac-x.xx-xx.i386.rpm
```
(x.xx-xx: the version of installing FC Array Mode Auto-Changeover Tool)

Tips Input the following command, and verify the contents of RPM file.

```
# rpm -qpi fcmacmgr-x.xx-xx.i386.rpm
```
(x.xx-xx: the version of installing FC Array Mode Auto-Changeover Tool)

Now installation is over.
According to your requirements, refer "Environment Setting" mentioned later, and change the behavior of FC Array Mode Auto-Changeover Tool.

3.3. Uninstallation

3.3.1 How to Uninstall

Uninstall FC Array Mode Auto-Changeover Tool according to the following procedure.

1) Log on as **root** user.

2) Input the following command to uninstall FC Array Mode Auto-Changeover Tool.

```
# rpm -ev fcmacmgr
```

Now uninstallation is over.

4.Environment Setting

4.1. Setting of Configuration File

To change the behavior of FC Array Mode Auto-Changeover Tool, open the configuration file by text editors, and configure the following values.

Tips The path name of configuration file is ”(Installed folder name)/fcmacmgr.ini" on Windows, and “/etc/fcmacmgr.conf” on Linux.

Parameter Name	Key Name	Unit	Range	Default
Wait Time to Check FC Array Mode At First	WaitPoll	second	0 ～ 4294967	60
	Set the interval to await the first trial to check the mode of FC Array after FC Array Mode Auto-Changeover Tool service starts. (**If 0[sec] is set, the first check will perform immediately right after the service will start.**) If no INI file is found or this value is invalid, FC Array Mode Auto-Changeover Tool will behave with default value.			
Interval to Check FC Array Mode	Interval	second	1 ～ 4294967	300
	Set the interval to check the state of FC Array. If no INI file is found or this value is invalid, FC Array Mode Auto-Changeover Tool will behave with default value.			
Timeout Value to Await Devices Opened(*1)	WaitDev	second	1 ～ 4294967	60
	Set the timeout value to await responses from FC Array to check the connection with it. If no INI file is found or this value is invalid, FC Array Mode Auto-Changeover Tool will behave with default value.			
Retrial Times to Await Devices Opened	Retry	times	0 ～ 3	1
	Set the number of times to retry to await responses from FC Array to check the connection with it. (**If 0[times] is set, no retrial will be attempted.**) If no INI file is found or this value is invalid, FC Array Mode Auto-Changeover Tool will behave with default value.			

*1)On Linux Edition, Timeout Value to Await Devices Opened has no effect upon the behavior of FC Array Mode Auto-Changeover Tool even if it is configured.

To enable the change of configuration file, restart FC Array Mode Auto-Changeover Tool service.

[Windows Edition]

Open [Services] dialog box, and restart “FC Array Mode Auto-Changeover Tool” service.

[Linux Edition]

Execute the commands

```
# /etc/rc.d/init.d/fcmacmgr stop
# /etc/rc.d/init.d/fcmacmgr start
```

or the command

```
# /etc/rc.d/init.d/fcmacmgr restart
```

and FC Array Mode Auto-Changeover Tool daemon will be restarted.