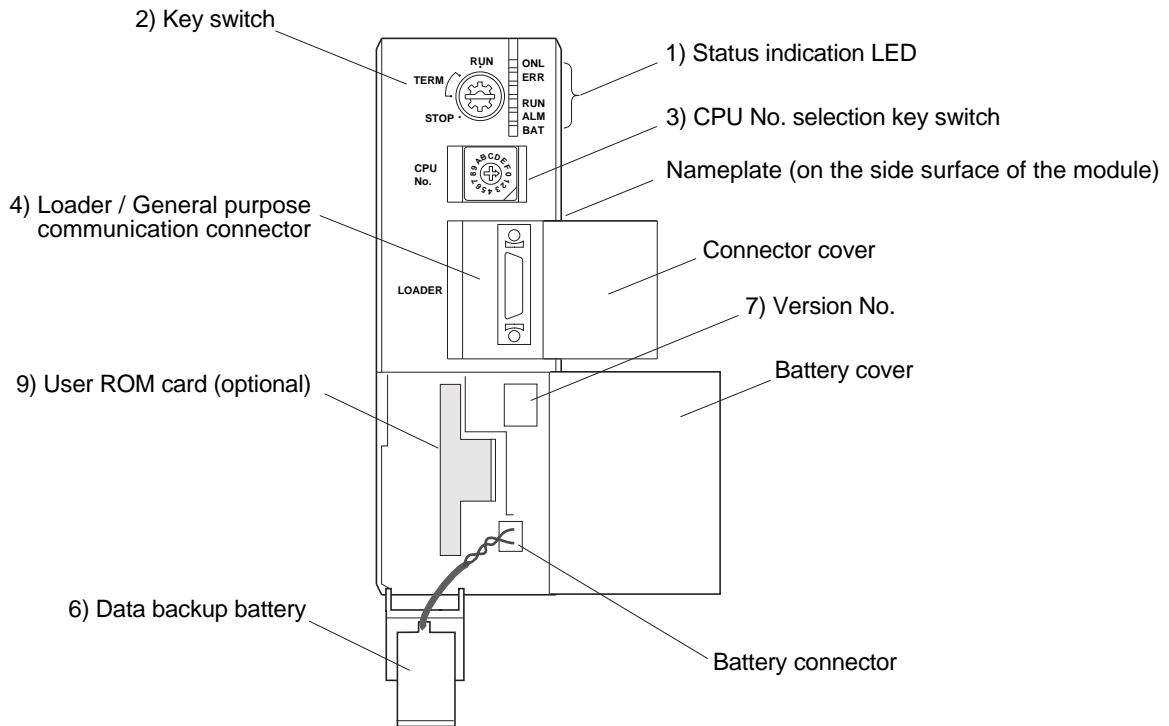
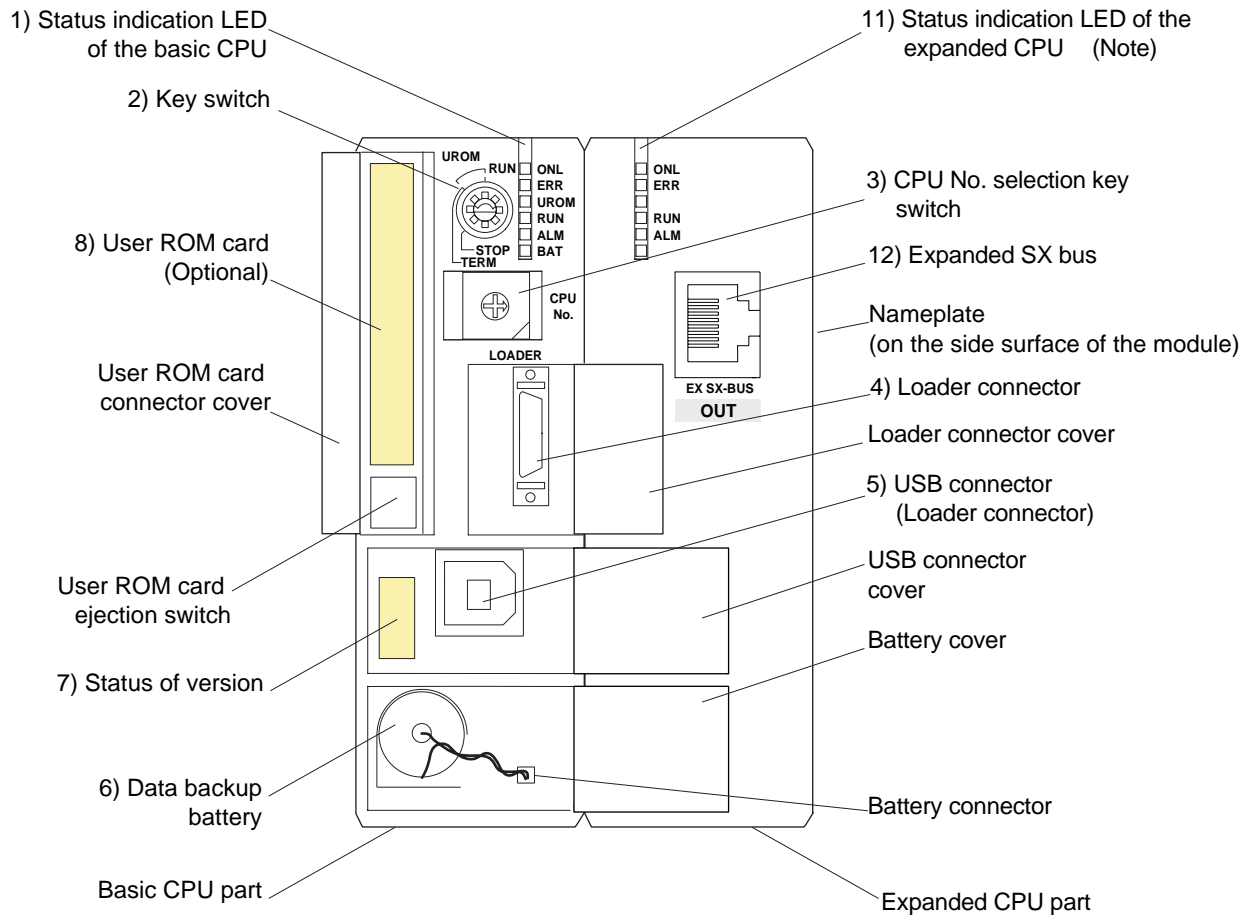


(5) SPH200 NP1PH-16/NP1PH-08



(6) SPH300EX NP1PS-74D



\* For specification and operation of the SPH300EX, refer to the "User's Manual SPH300EX" (FEH192).

## 1) Status indication LED

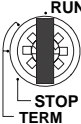


Symbol	Color	Description																		
ONL ERR	Green Red	Status of own CPU module  <Lights on pattern> <table border="1" style="margin-left: 20px;"> <tr> <td>ONL</td> <td>ERR</td> <td>Status of own CPU module</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>Power OFF, system resetting or initializing</td> </tr> <tr> <td>Blinks</td> <td>-</td> <td>SX bus standing on</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>Normally running (initial diagnosis completed)</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>Nonfatal fault, at a running</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>Fatal fault at a stop</td> </tr> </table>	ONL	ERR	Status of own CPU module	OFF	OFF	Power OFF, system resetting or initializing	Blinks	-	SX bus standing on	ON	OFF	Normally running (initial diagnosis completed)	ON	ON	Nonfatal fault, at a running	OFF	ON	Fatal fault at a stop
ONL	ERR	Status of own CPU module																		
OFF	OFF	Power OFF, system resetting or initializing																		
Blinks	-	SX bus standing on																		
ON	OFF	Normally running (initial diagnosis completed)																		
ON	ON	Nonfatal fault, at a running																		
OFF	ON	Fatal fault at a stop																		
UROM	Green	Lights on continuously when the CPU recognizes a user ROM card. Lights on continuously when a user ROM card (compact flash card) is correctly installed in the CPU module and the key switch is set to UROM. (User ROM card adapted high-performance CPU, SPH 2000/3000 only)																		
RUN ALM	Green Red	Status of system (Note)  <Lights on pattern> <table border="1" style="margin-left: 20px;"> <tr> <td>RUN</td> <td>ALM</td> <td>Status of system</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>Power OFF or application program at a stop</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>Normally running</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>Nonfatal fault, at a running</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>Fatal fault, at a stop</td> </tr> <tr> <td>Blinks</td> <td>-</td> <td>While the CPU is accessing the user ROM</td> </tr> </table>	RUN	ALM	Status of system	OFF	OFF	Power OFF or application program at a stop	ON	OFF	Normally running	ON	ON	Nonfatal fault, at a running	OFF	ON	Fatal fault, at a stop	Blinks	-	While the CPU is accessing the user ROM
RUN	ALM	Status of system																		
OFF	OFF	Power OFF or application program at a stop																		
ON	OFF	Normally running																		
ON	ON	Nonfatal fault, at a running																		
OFF	ON	Fatal fault, at a stop																		
Blinks	-	While the CPU is accessing the user ROM																		
BAT	Orange	Turned on when data backup battery dropped or disconnected.																		

Note: The system includes the own CPU.

## 2) Key switch

How the CPU operates when individual key switch is set at various positions is described below.

### <Other than user ROM card adapted high-performance CPU,SPH2000/3000>

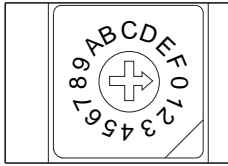
Position of key	Operation of CPU
RUN 	<ul style="list-style-type: none"> <li>When this switch is changed over from STOP or TERM to RUN, the CPU module starts operation.</li> <li>If this switch is at the RUN position when powered on, the CPU starts running.</li> <li>* Monitoring and reading from loader are possible. (Data can be read or written.)</li> </ul>
TERM 	<ul style="list-style-type: none"> <li>The previous condition is kept.</li> <li>When this switch is changed over from STOP to TERM, the CPU module continues to be stopped.</li> <li>When this switch is changed over from RUN to TERM, the CPU module continues to run.</li> <li>If the system is powered on when this switch is at the TERM position, the CPU operates according to the setting of [Running specification at power on] on the [CPU running definition] tab window.</li> <li>• TERM = Run (default) ⇒ Operation is started.</li> <li>• TERM = Last State, ⇒ When the power was turned off in running condition last time, operation is started. When the power was turned off in stop condition last time, operation is not started.</li> <li>• TERM = Stop ⇒ Operation is not started.</li> <li>* Monitoring, reading and writing from loader are possible.</li> </ul>
STOP 	<ul style="list-style-type: none"> <li>When this switch is changed over from RUN or TERM to STOP, the CPU module stops.</li> <li>If this switch is at the STOP position when powered on, the CPU stops. Operation is not started.</li> <li>* Monitoring and reading from loader are possible. (Data can be read or written.)</li> </ul>

### <User ROM card adapted high-performance CPU,SPH 2000/3000>

- \* For more information about the operation of CPU, refer to "Appendix 1 Operation of the user ROM card adapted CPU with Key Switches".

**3) CPU No. selection key switch**

This switch is used to select the CPU number. Be sure to select "0" for a one-CPU system. CPU number is selected in order from "0" for the multi-CPU system.



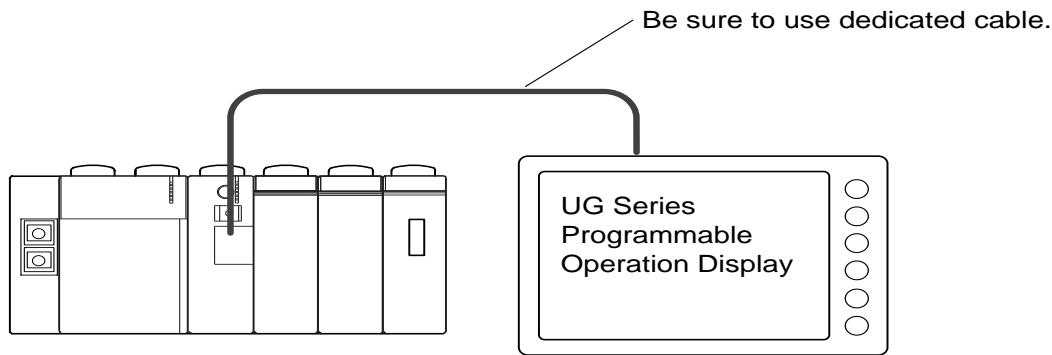
Note: Do not change during operation, otherwise, system stop might be caused.

**4) Loader / General purpose communication connector**

Used to connect a program loader.

**[Note: ]**

It is possible to connect FUJI UG Series Programmable Operation Display to the program loader connector.

**5) USB / USB-miniB connector (program loader connector)**

Used to connect a program loader. Use commercially available USB cable.

Note: USB (Universal Serial Bus) is a standard for external peripheral devices for personal computer. When you use a USB cable, be careful of the following matters, taking into consideration the noise immunity of the personal computer to be connected.

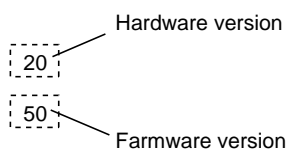
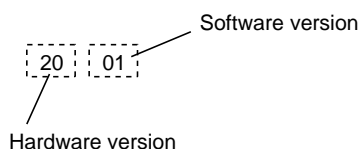
- USB cable should be separated from power line as far as possible.

**6) Data backup battery**

The battery backs up the retain memory, the calendar data and so on in the CPU module. Backup time: 5 years (at 25°C).

**7) Version No.**

Version No. of the CPU module is described.

**SPH300/SPH200/SPH300EX****SPH2000/3000****8) User ROM card (compact flash card)**

Application programs, system definitions, zipped files and compressed projects can be saved in user ROM cards. (User ROM card is optional)

For more information about the specification and handling of user ROM card, refer to 3-3-3 (Specification of user ROM card (compact flash card)).

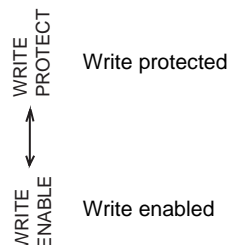
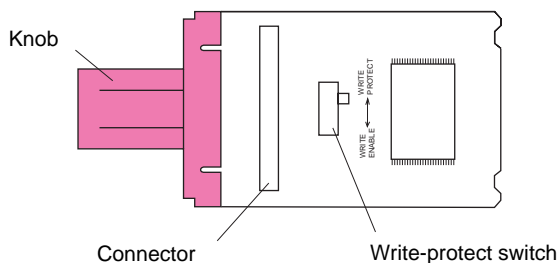
**9) User ROM card (SD card)**

Application programs, system definitions, zipped files and compressed projects can be saved in user ROM cards. (User ROM card is optional)

For more information about the specification and handling of user ROM card, refer to 3-3-4 (Specification of user ROM card (SD card)).

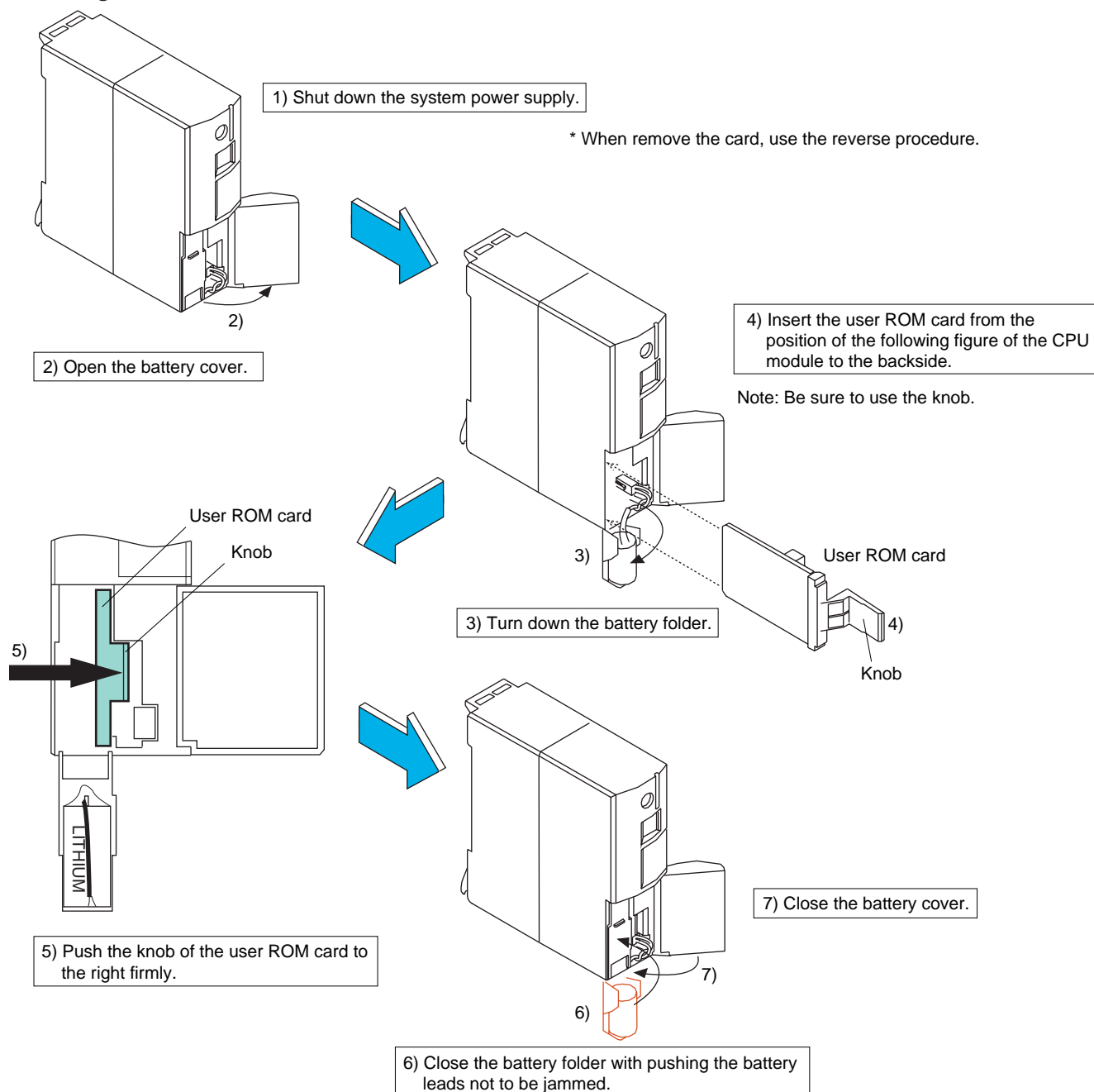
## 10) User ROM card NP8PMF-16 (optional)

This card is used to store application program, system definition and ZIP file of a standard CPU module into the flash ROM. Mounting this card enables battery-less operation of standard CPU.



Note: Set to "Protected" when program, system definition and ZIP file are not rewritten.

### <Mounting the user ROM card>



## 11) Status indication LED of the expanded CPU

Symbol	Color	Description
ONL ERR	Green Red	Status of expanded CPU module
		<Lights on pattern>
		ONL ERR Status of own CPU module
		OFF OFF Power OFF, system resetting or initializing
		Blinks - SX bus standing on
		ON OFF Normally running (initial diagnosis completed)
		ON ON Nonfatal fault, at a running
		OFF ON Fatal fault at a stop
RUN ALM	Green Red	Status of system (Note)
		<Lights on pattern>
		RUN ALM Status of system
		OFF OFF Power OFF or application program at a stop
		ON OFF Normally running
		ON ON Nonfatal fault, at a running
		OFF ON Fatal fault, at a stop

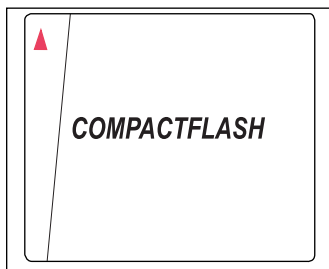
Note: The system includes the basic and expanded CPU.

## 11) SX bus expansion

This bus is specifically for applications that require high-speed I/O response. The devices that can be connected to the bus are limited to I/O modules that are compatible with the SX bus and servos and inverters conforming to these I/O modules.

## 3-3-3 Specification of user ROM card (compact flash card)

### (1) Appearance and specification



#### <Specification of user ROM card>

Type (maker)	NP8PCF-256
Standard	Compact flash ATA card, Type I CFA 3.0
Specification of card	Industrial grade Operating temperature: -25 to 85 Number of re-write: more than 100 thousands
Memory capacity	256MB

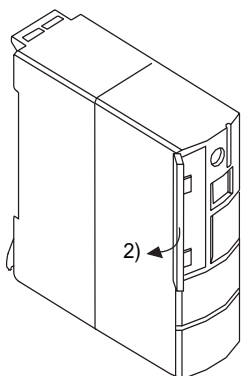
Note: 1 When you install a user ROM card in the loader and directly access it, use commercially available compact flash adapter for PCMCIA card slot or commercially available compact flash reader/writer.

Note: 2 Format the user ROM card in "FAT."  
In case of SPH2000, "FAT" or "FAT32".

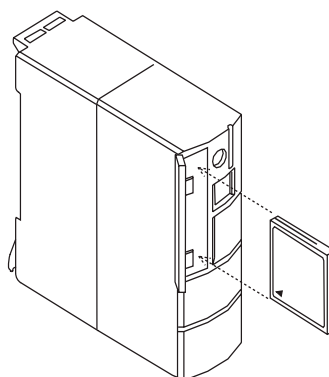
### (2) User ROM card mounting procedure

\* For removal, do in the reverse order.

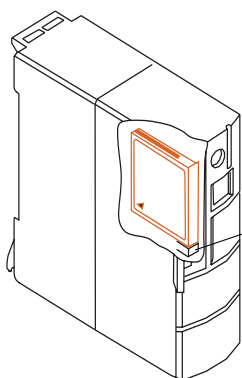
1) Shut down the system power supply or set the key switch to a position other than UROM. (The UROM LED turned off.)



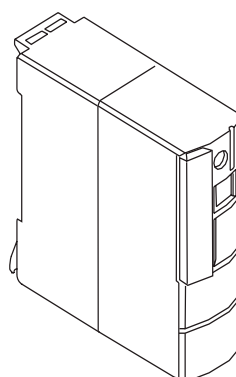
2) Open the user ROM card connector cover.



3) Insert a user ROM card in the slot of the CPU module, according to the above figure.



4) When a user ROM card is inserted, the user ROM card eject button is protruded. (Press this button to take the card out.)



5) Close the user ROM card connector cover.

6) Turn the system power supply ON and set the key switch to UROM, and the CPU module will recognize the user ROM card.

## 3-3 CPU module Specifications

### (3) Operation of the CPU when it recognizes a user ROM card

State of user ROM card	When CPU stops	When CPU is running	When CPU starts to run from stop condition
1) Initialized, no run project	Clears the flash memory in the CPU in which run project is stored.	Outputs nonfatal fault signal and sets mismatch flag ON. (Note 1)	Clears the internal flash memory of the CPU in which run project is stored.
2) Run project normal (the content of CPU internal flash memory does not match that of the user ROM card) (Note 5)	Updates the CPU internal flash memory (by copying the content of the user ROM card).	Outputs nonfatal fault signal and sets mismatch flag ON.	Updates the CPU internal flash memory (by copying the content of the user ROM card).
3) Run project error (user ROM card not initialized, file destroyed, etc.) (Note 2, Note 6)	CPU comes in fatal fault condition.	Outputs fatal fault signal and sets mismatch flag ON.	CPU comes in fatal fault condition.

Notes:1) Mismatch flag is %MX10.4.12. Nonfatal fault does not occur when no run project exists in the CPU, either.

2) The CPU detects physical error when it can recognize the user ROM card but can read no sector data.

When the CPU cannot recognize the user ROM card, it operates the same as no card being set.

3) To initialize the user ROM card, insert the card in the CPU module and execute "Resource initialization," or execute "Initialize" in the memory card menu of loader.

4) Execution of "Resource initialization" with a user ROM card mounted in the CPU module cannot initialize the user ROM card in DOS format. When DOS format is destroyed, execute offline initialization.

5) When the power switch of the CPU module is turned on, it may take approximately 3 minutes to copy the content of the user ROM card in the internal flash memory of the CPU. Multi-CPU system recognizes this condition as the copying CPU being disconnected by other CPU. In such case, turn the system on again after the RUN LED of the copying CPU stops blinking.

6) Be sure to initialize (FAT format) the user ROM card before you use it.

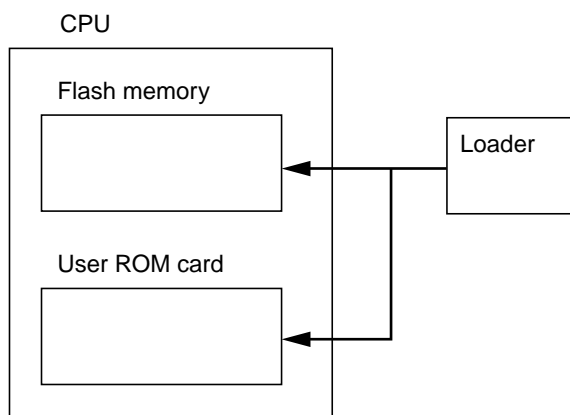
### (4) Timing to transfer data from user ROM card to CPU internal flash memory

When transferring data (application program, system definition, ZIP file) from the user ROM card installed in the CPU module to the CPU internal flash memory under the following conditions, the content of the user ROM card is compared with that of the CPU internal flash memory and the data is transferred if the comparison results in mismatch.

- When the power switch of the CPU module is turned ON with the key switch set at UROM
- When resetting is performed from loader with the key switch set at UROM
- When the key switch is changed over to UROM from a position other than UROM while the CPU stops.

### (5) Downloading from the user ROM card mounted in the CPU module

To download data from loader to the user ROM card mounted in the CPU module, set the key switch to UROM\_TERM (the UROM LED lights up) and execute the downloading from loader to the CPU. Then, the data is downloaded to the internal flash memory of the CPU as well as to the user ROM card at a time.



Notes: 1) When unformatted or write protected user ROM card is mounted in the CPU module, no data is downloaded to the flash memory or the user ROM card.

Notes: 2) It is possible to insert the user ROM card in the personal computer in which Loader is installed and to download the data.

For the operating method, refer to the "User's Manual Loader <Reference>."

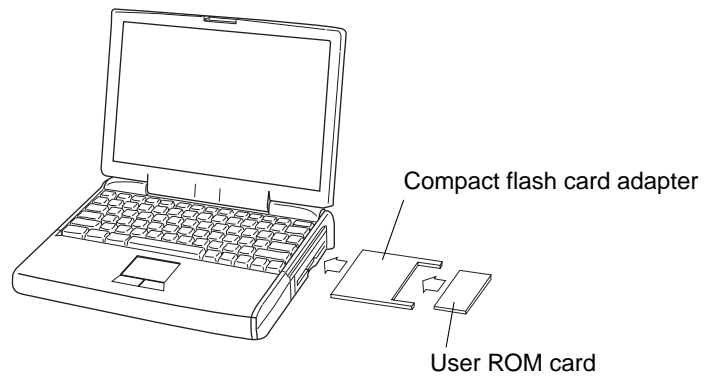
## 3-3 CPU module Specifications

### (6) How to initialize the user ROM card

#### 1) Offline initialization

Insert the user ROM card in the compact flash card adapter or compact flash card reader/writer to make the personal computer recognize the card. For initialization, "Memory card utility" in the "Extras" menu of loader is used. The utility executes both DOS formatting and initialization (creation of directories and files).

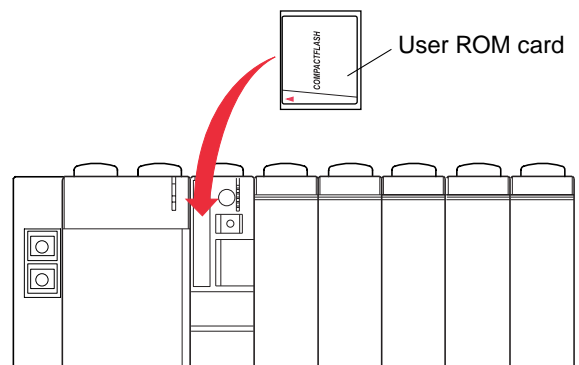
Note: Perform the DOS formatting in "FAT."



#### 2) Initialization by mounting a user ROM card in the CPU module

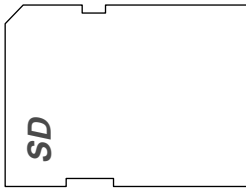
When you initialize a user ROM card that is mounted in the CPU module, be careful that only DOS formatted cards can be initialized (to create directories and files).

Insert a user ROM card in the CPU module and execute "Resource initialization" from loader when the CPU recognizes the user ROM card.



3-3-4 Specification of user ROM card (SD card)

(1) Appearance and specification



 SDHC logo is trademark

<Specification of user ROM card>

Item	Contents	
PLC card slot specification	Standard	SD Physical layer Specification Version 2.00
	Supported memory card	SD memory card, SDHC memory card
	Specification	Power supply: 3.3V ± 0.3V, Max 100mA
ROM card specification	Type	NP8PSD-002
	Standard	SD card spec V1.1
	Card specification	Industrial grade Operating Temperature: -40 to 85
	Memory capacity	2GB

Note: 1 When you install a user ROM card in the loader and directly access it, use commercially available SD card adapter for PCMCIA card slot or commercially available SD card reader/writer.

Note: 2 Format the user ROM card in "FAT" or "FAT32".

Note: 3 Number of re-write of user ROM.

Number of re-write varies depends on writing data size.

Below table shows Fuji user ROM card (Type:NP8PSD-002) as reference.

Write data size	Number of re-write	Note
1MB	2 millions	Max writing data size by application program is 1MB
20MB	100 thousands	Download project size may exceed 1MB depends on program

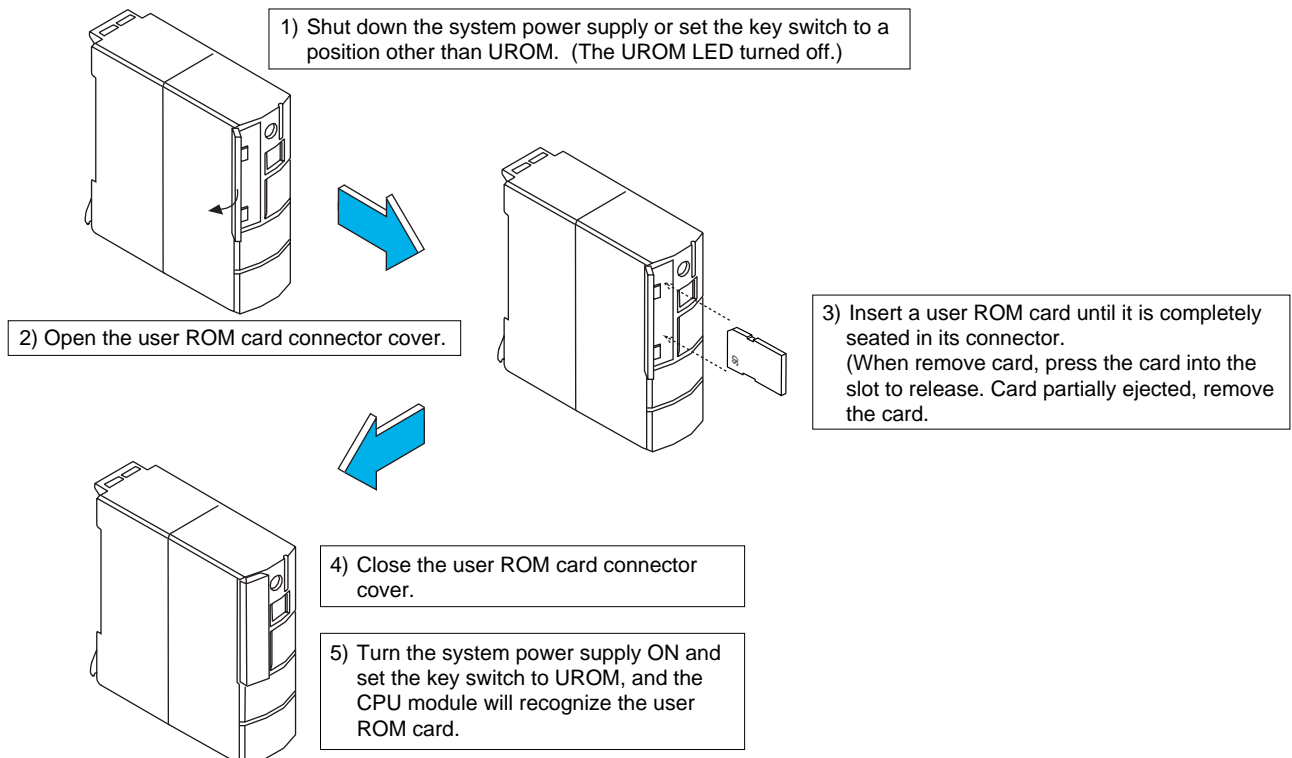
Note: 4 We recommend to use Fuji user ROM card.

If you use market sale SD card, check operation by yourself. In this case, do not use mini SD/ micro SD with SD adapter.

Make sure to use SD card.

(2) User ROM card mounting procedure

\* For removal, do in the reverse order.



### (3) Operation of the CPU when it recognizes a user ROM card

State of user ROM card	When CPU stops	When CPU is running	When CPU starts to run from stop condition
1) Initialized, no run project	Clears the flash memory in the CPU in which run project is stored.	Outputs nonfatal fault signal and sets mismatch flag ON. (Note 1)	Clears the internal flash memory of the CPU in which run project is stored.
2) Run project normal (the content of CPU internal flash memory does not match that of the user ROM card) (Note 5)	Updates the CPU internal flash memory (by copying the content of the user ROM card).	Outputs nonfatal fault signal and sets mismatch flag ON.	Updates the CPU internal flash memory (by copying the content of the user ROM card).
3) Run project error (user ROM card not initialized, file destroyed, etc.) (Note 2, Note 6)	CPU comes in fatal fault condition.	Outputs fatal fault signal and sets mismatch flag ON.	CPU comes in fatal fault condition.

- Notes:1) Mismatch flag is %MX10.4.12. Nonfatal fault does not occur when no run project exists in the CPU, either.  
 2) The CPU detects physical error when it can recognize the user ROM card but can read no sector data. When the CPU cannot recognize the user ROM card, it operates the same as no card being set.  
 3) To initialize the user ROM card, insert the card in the CPU module and execute "Resource initialization," or execute "Initialize" in the memory card menu of loader.  
 4) Execution of "Resource initialization" with a user ROM card mounted in the CPU module cannot initialize the user ROM card in DOS format. When DOS format is destroyed, execute offline initialization (Format card by "FAT" or "FAT32").  
 5) When the power switch of the CPU module is turned on, it may take approximately 3 minutes to copy the content of the user ROM card in the internal flash memory of the CPU. Multi-CPU system recognizes this condition as the copying CPU being disconnected by other CPU. In such case, turn the system on again after the RUN LED of the copying CPU stops blinking.  
 6) Be sure to initialize ("FAT" or "FAT32" format) the user ROM card before you use it.

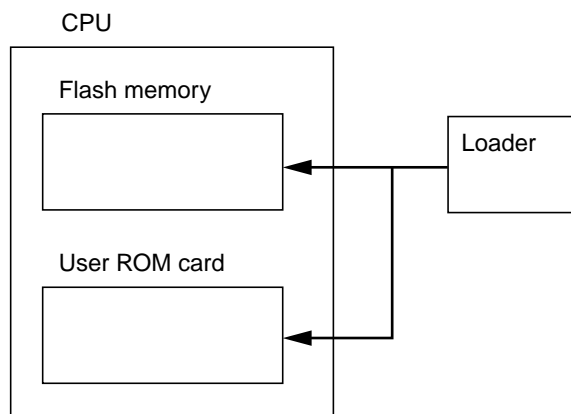
### (4) Timing to transfer data from user ROM card to CPU internal flash memory

When transferring data (application program, system definition, ZIP file) from the user ROM card installed in the CPU module to the CPU internal flash memory under the following conditions, the content of the user ROM card is compared with that of the CPU internal flash memory and the data is transferred if the comparison results in mismatch.

- When the power switch of the CPU module is turned ON with the key switch set at UROM
- When resetting is performed from loader with the key switch set at UROM
- When the key switch is changed over to UROM from a position other than UROM while the CPU stops.

### (5) Downloading from the user ROM card mounted in the CPU module

To download data from loader to the user ROM card mounted in the CPU module, set the key switch to UROM\_TERM (the UROM LED lights up) and execute the downloading from loader to the CPU. Then, the data is downloaded to the internal flash memory of the CPU as well as to the user ROM card at a time.



- Notes: 1) When unformatted or write protected user ROM card is mounted in the CPU module, no data is downloaded to the flash memory or the user ROM card.  
 Notes: 2) It is possible to insert the user ROM card in the personal computer in which Loader is installed and to download the data. For the operating method, refer to the "User's Manual Loader <Reference>."

## 3-3 CPU module Specifications

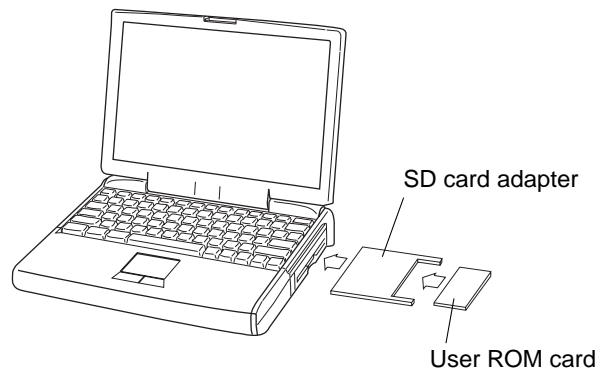
### (6) How to initialize the user ROM card

#### 1) Offline initialization

Insert the user ROM card in the SD card adapter or SD card reader/writer to make the personal computer recognize the card.

For initialization, "Memory card utility" in the "Extras" menu of loader is used. The utility executes both DOS formatting and initialization (creation of directories and files).

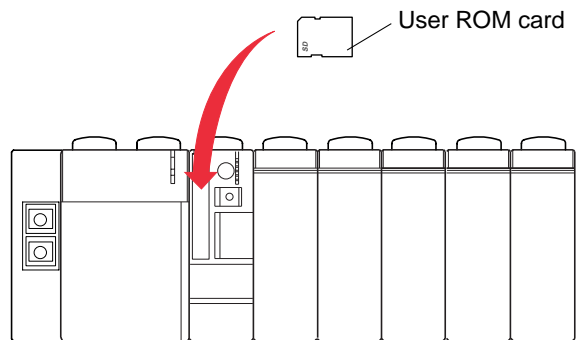
Note: Perform the formatting in "FAT" or "FAT32".



#### 2) Initialization by mounting a user ROM card in the CPU module

When you initialize a user ROM card that is mounted in the CPU module, be careful that only DOS formatted cards can be initialized (to create directories and files).

Insert a user ROM card in the CPU module and execute "Resource initialization" from loader when the CPU recognizes the user ROM card.



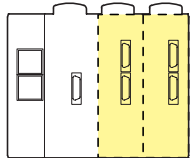
## 3-4-1 Specifications

Type	Specification			
	No. of slots	No. of processor buses	Internal power consumption 24V DC	Mass
NP1BS-03	3 slots	2 slots	35 mA or less	Approx. 250g
NP1BS-06	6 slots	4 slots	45 mA or less	Approx. 420g
NP1BS-08	8 slots	3 slots	50 mA or less	Approx. 540g
NP1BS-08S	8 slots	3 slots	60 mA or less	Approx. 550g
NP1BS-08D	8 slots	3 slots	70 mA or less	Approx. 550g
NP1BS-11	11 slots	3 slots	60 mA or less	Approx. 720g
NP1BS-11S	11 slots	3 slots	70 mA or less	Approx. 730g
NP1BS-11D	11 slots	3 slots	80 mA or less	Approx. 730g
NP1BS-13	13 slots	3 slots	70 mA or less	Approx. 840g
NP1BS-13S	13 slots	3 slots	80 mA or less	Approx. 850g
NP1BS-13D	13 slots	3 slots	80 mA or less	Approx. 850g
NP1BP-13	13 slots	10 slots	70 mA or less	Approx. 840g
NP1BP-13S	13 slots	10 slots	80 mA or less	Approx. 850g
NP1BP-13D	13 slots	10 slots	80 mA or less	Approx. 850g

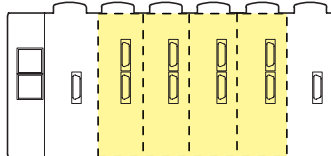
Note: For dimensions, refer to "3-11 Dimensions."

### <Processor bus connectable slots>

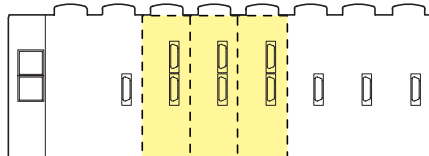
NP1BS-03



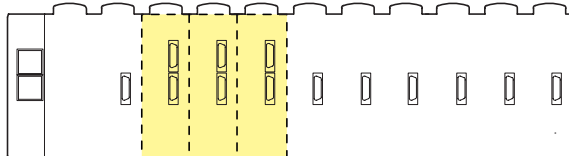
NP1BS-06



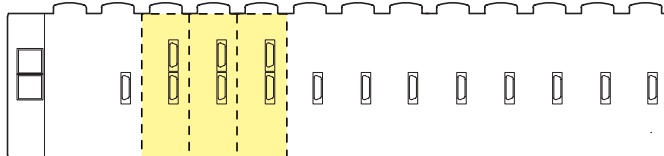
NP1BS-08/NP1BS-08S/NP1BS-08D



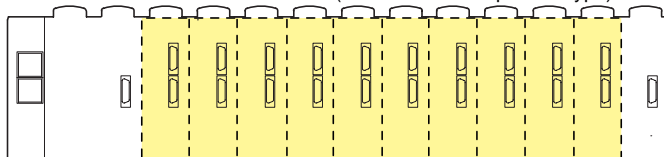
NP1BS-11/NP1BS-11S/NP1BS-11D




NP1BS-13/NP1BS-13S/NP1BS-13D



NP1BP-13/NP1BP-13S/NP1BP-13D (Processor bus expanded type)



 Indicates a slot with a processor bus connector.

### Key-point

- One power supply module and at least one module other than a power supply module should be mounted on the base board.
- The power supply module should be mounted on the left end of the base board.
- Number of connectable base boards is a maximum of 25 including SX bus T-branch units (NP8B-TB) bus T-branch units (NP8B-TB).
- In the system which two or more base boards are connected by the SX bus expansion cable, if several bases (power supplies) are required to be OFF, the number of bases should be a maximum of three in series. (Though four or more bases in series can be turned OFF to operate, the reliability of SX bus communication is greatly reduced.) For more information, refer to 2-2-2 (3) (Precautions for connecting baseboards and units to the SX bus).