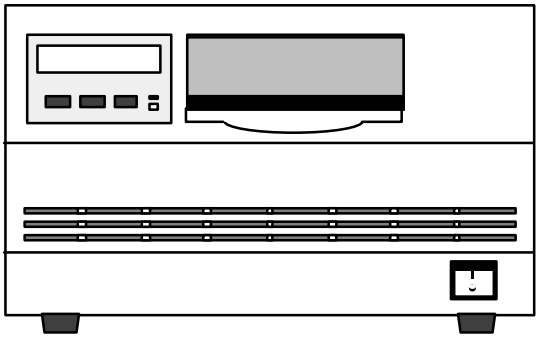
MP-8400 Series

1/2 inch Cartridge Tape Subsystem

User Manual



KAT-M029-005

Thank You For Your Purchase.

To ensure correct operation, please read this USER MANUAL before using your purchase. After reading this manual, store it in a safe place for future reference.

Revision : 5.21

3/30/2001

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1	User Manual	1	
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5	Clamp Filter	2	
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Chapter 1 GENERAL DESCRIPTION

1.1 Overview

The MS-8418 is a 18 track, 1/2 inch cartridge tape drive that is fully compatible with the IBM 3480/3490. The MS-843x is a 36 track drive fully compatible with the IBM 3490E.

Both drives are equipped with the industry standard SCSI interface, which enables simple connection to computers. In addition, both drives support IDRC, the industry standard for data compression. Average of 600MB of data can be stored onto a cartridge with the MS-8418 and average of 2.4GB can be stored with the MS-843x using the extended cartridge (332m tape).

1.2 Features

These tape drives have the following features (the features differ depending on the specifications).

High-speed Backup

Continuous data transfers are possible at a speed of 3MB/sec., even without the use of compression. Maximum burst transfer speed is 20MB/sec.

Large-volume Backup

An average of 2.4GB of data can be stored per 1 cartridge when IDRC compression is used.

Compatibility

The drives are compatible with IBM 3480/90/90E, thus facilitating the exchange of data with host computers.

Easy Connection

The SCSI-2/3 interface is used for easy connection to work stations, personal computers and other types of computers.

Expandability

The drive firmware is stored in the flash ROM. To improve the functions, firmware updates are also possible from tape.

The 18-track specifications can be changed to 36-track specifications and the SCSI-2 specifications can be changed to SCSI-3, etc.

1.3 Model Name

1.3.1 Model Names by Track Specification

Track Specifications / Tape Speed	MS-8418	MS-843x	
	18 track Drive	18/36 track Drive	36 track Drive
Standard Speed	MS-8418	MS-843E	MS-8436

1.3.2 Model Names by SCSI Specification

Model Name		SCSI Connector Specifications	SCSI Electrical Specifications
MS-8418 MS-843x	LS	Low-density 50pin (Amphenol)	Single-ended
	WS	Hi-density 68pin (Wide SCSI)	
	WD	Hi-density 68pin (Wide SCSI)	Differential

1.4 Specifications

1.4.1 Performance Specifications

Number	Parameter		MS-8418	MS-843x
1	Tape Speed	Read / Write	2 m/s (79 ips)	
		Rewind	4 m/s (157 ips)	
	Speed Variation		4 % (Long Term) 7 % (Short Term)	
	Access Time (Standard)	Read / Write	100 ms	
		Rewind	200 ms	
2	Load Time (average)		20 sec	
	Unload Time (average)		18 sec	
	Rewind Time (max.)		45 sec	90 sec
				3 sec (from EOT)
3	Read / Write Head		18 track	36 track
4	Interface **(1)**		Fast SCSI - 2 (A Cable) SCSI - 3 (P Cable) (Single-ended or Differential)	
5	Burst Transfer Rate (SCSI asynchronous)		5 MB/s (Narrow:8 bit) 10 MB/s (Wide:16 bit)	
	Burst Transfer Rate (SCSI synchronous)		10 MB/s (Narrow:8 bit) 20 MB/s (Wide:16 bit)	
	Data Transfer Rate (tape head)		3 MB/s	
6	Block Size (max.)		256 kB	
7	Data Buffer Size		2 MB	

(1) Equipped with one type of interface per your specification. Refer to section 1.3.2.

1.4.2 Read/Write Operation

Number	Parameter	MS-8418	MS-843x	
		18 track Drive	18/36 track Drive	36 track Drive
1	Write Operation	18-track Format	18-track Format **(2)**	36-track Format
			36-track Format	
2	Read Operation	18-track Format	18-track Format	
			36-track Format	

(2) The 18-track write operation is IBM compatible but does not conform to ANSI. Use caution when exchanging data with the drives of other companies.

1.4.3 Format Specifications

Number	Parameter		18-track Format	36-track Format
1	Recording Format	Uncompressed	IBM 3480 Compatible (ANSI X3B5)	IBM 3490E Compatible (ANSI X3B5)
		Compressed	IBM 3490 Compatible (ANSI X3B5)	IBM 3490E Compatible (ANSI X3B5)
	Compression Mode		IBM IDRC Compaction Compatible (Improved Data Recording Capability)	
	Error Correction		Cross Parity	Reed Solomon
2	Record Density		1491 cpmm (37871 bpi)	
3	Medium Length		165 m (541 ft.)	165 m (541 ft.) 332 m (1100 ft.)
4	Capacity	Uncompressed	200 MB (max.)	800 MB (max.)
		Compressed	600 MB (3:1)	2.4 GB (3:1)

1.4.4 Reliability Specifications

Number	Parameter	Specification
1	MTBF	30000 hours (25% duty cycle)
2	MTTR	Under 30 minutes
3	Head Life	3000 hours (Tape motion)

1.4.5 Power Specifications

Number	Parameter	Specification
1	Voltage	100 to 120 V, AC 220 to 240 V, AC (Automatic ranging)
2	Line Frequency	50/60 Hz
3	Power Consumption	110 W

1.4.6 Environmental Specifications

Number	Parameter		Specification
1	Operating	Dry Bulb Temperature	10°C to 40°C
		Temperature Gradient	10°C / hour
		Wet Bulb Temperature	Max. 26°C
2	Operating	Relative Humidity	20% to 80% (non-condensing)
		Humidity Gradient	20% / hour
3	Non-operating	Dry Bulb Temperature	-10°C to 60°C
		Temperature Gradient	10°C / hour
4	Non-operating	Relative Humidity	5% to 95% (non-condensing)
		Humidity Gradient	20% / hour

NOTE

The applicable proposed ANSI specification for half-inch tape cartridge requires operation in the range of 16°C to 32°C, 20% relative humidity and a maximum wet bulb temperature of 25.6°C. Operation of this device beyond these limits may result in a degradation of media reliability.

1.4.7 Acoustical Noise

Number	Parameter	Specification
1	Power-on Idle	55 dB A (max.)
2	Operating	55 dB A (max.)

Machine Noise

Sound power level : less than 70 db (A) according to DIN45635 part 19 (EN27779).

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1.4.8 Mechanical Specifications

Number	Parameter		Specification
1	Dimensions	Height	176 mm (6.9 in.)
		Width	281 mm (11.1 in.)
		Depth	387 mm (15.2 in.)
2	Weight		15 kg (33 lb.)
3	Shipping Weight		19 kg (42 lb.)

1.4.9 Regulation

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

[Notes]

Chapter 2 OPERATION

2.1 Inspecting the Cartridge

The MS-8400 drive uses the industry-standard 3480-tape cartridge defined by ANSI Standard X3B5. Refer to Figure 2-1.

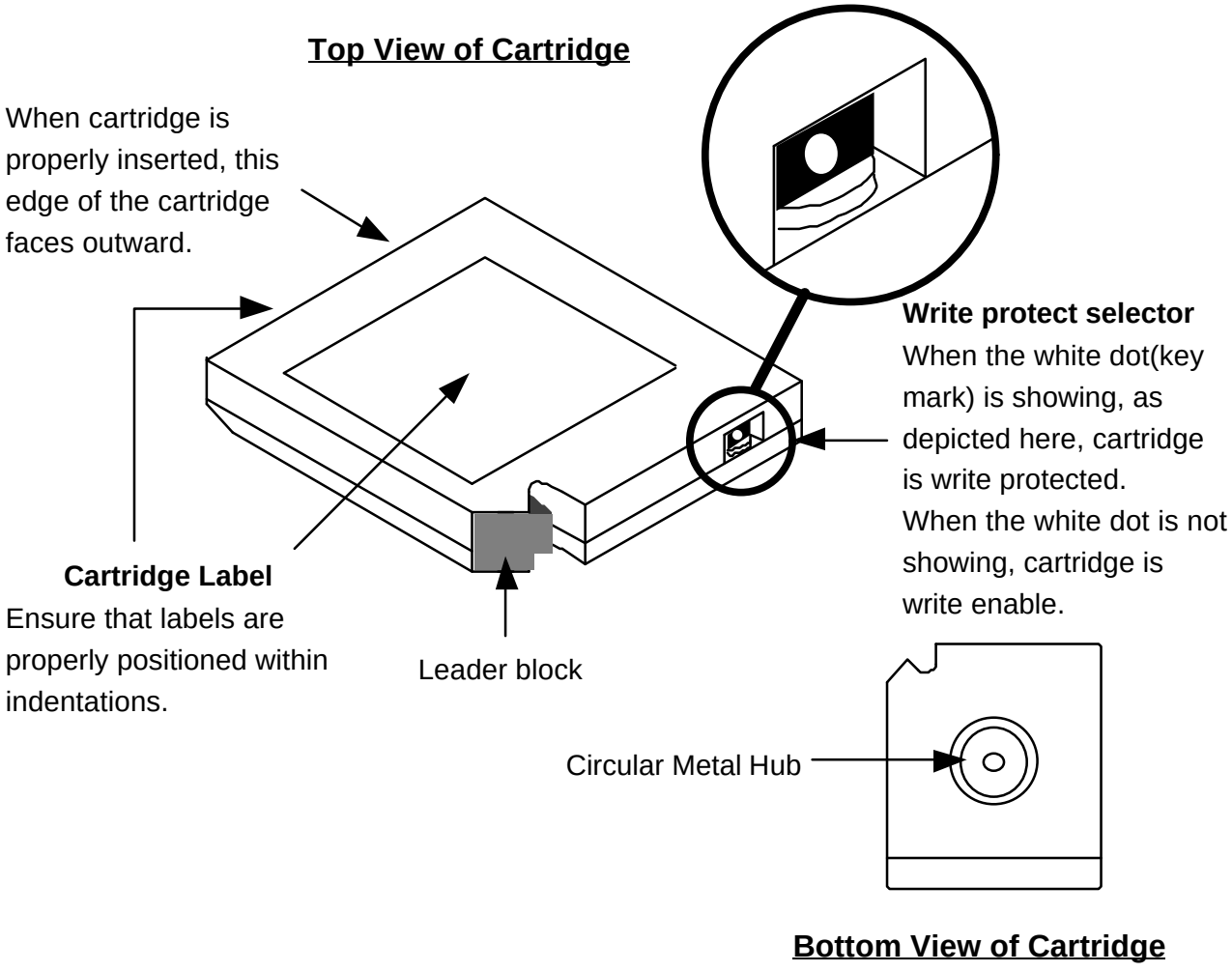


Figure 2-1 Half-inch Tape Cartridge

Prior to inserting the tape cartridge into the drive, inspect the cartridge for damage to prevent problems. A defective cartridge may prohibit successful loading of the cartridge or may damage the drive mechanism. Look for these defects:

- cracked or broken cartridge casing
- water or dirt on cartridge casing
- foreign material or obvious loose parts within the cartridge
- broken leader block or leader block not properly attached
- damaged write protect selector
- any other obvious damage
- cartridge label not properly affixed
- cartridge with other materials affixed rather than the label

The tape length that can be used differs depending on the specifications and operation. Table 2-1 shows the tape cartridges that can be used with this drive.

Table 2-1 Tape Length

Operation	Cartridge Name	Tape Length	Format Specification	
			18-track Format	36-track Format
Write	3480 (Standard)	165m (541ft.)	Recommended	OK
	Long (x1.5)	246m (807ft.)	OK	OK
	3490E (Extended)	332m (1100ft.)	NG	Recommended
Read	3480 (Standard)	165m (541ft.)	Recommended	OK
	Long (x1.5)	246m (807ft.)	OK	OK
	3490E (Extended)	332m (1100ft.)	OK	Recommended

CAUTION

The drive cannot load the cartridge is the contained tape is of insufficient length.

2.2 Operator Panel

2.2.1 Front View

The operator panel and power switch are located on the front panel. The operator panel is equipped with a 16-digit:2-line display, 3 switches and 2 indicators. These are used to operate the drive. Refer to Figure 2-2 and 2-3.

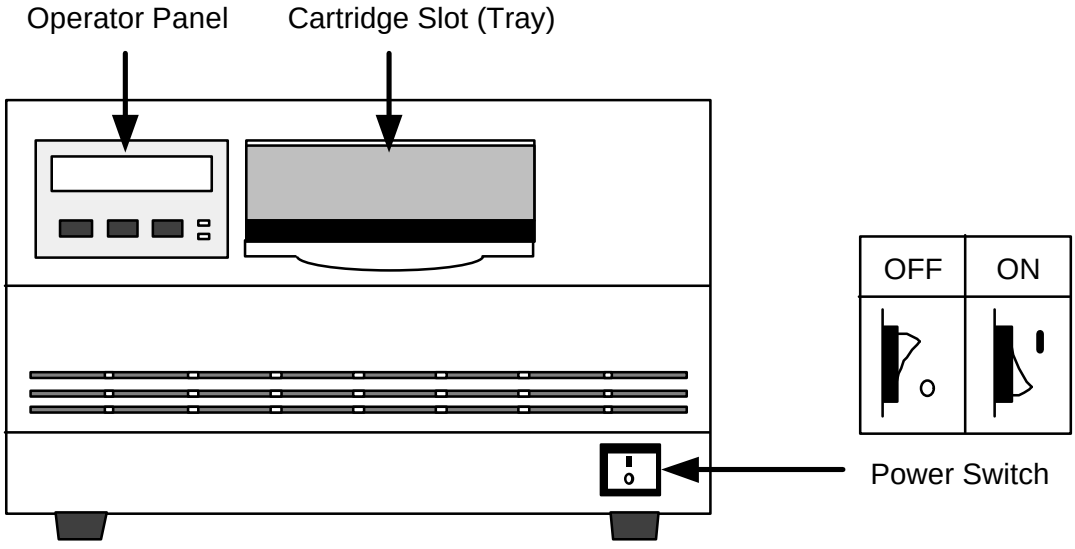


Figure 2-2 Front View of the Drive

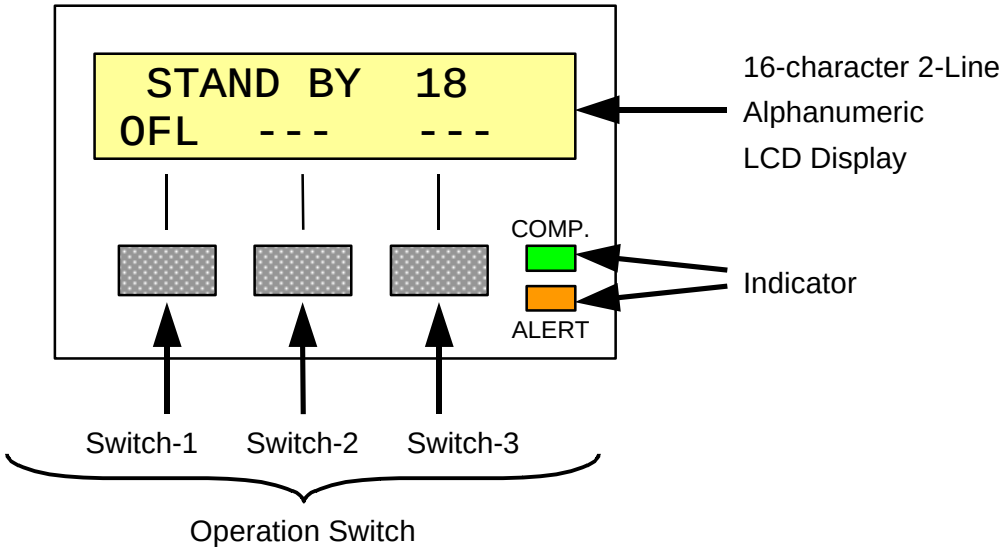


Figure 2-3 Operator Panel

2.2.2 Rear View

The SCSI connectors, maintenance port and AC power connector are located on the rear panel (Refer to Figure 2-4). The two SCSI connectors can be used for either input or output. The maintenance port is used only for troubleshooting and should not be connected during normal operation.

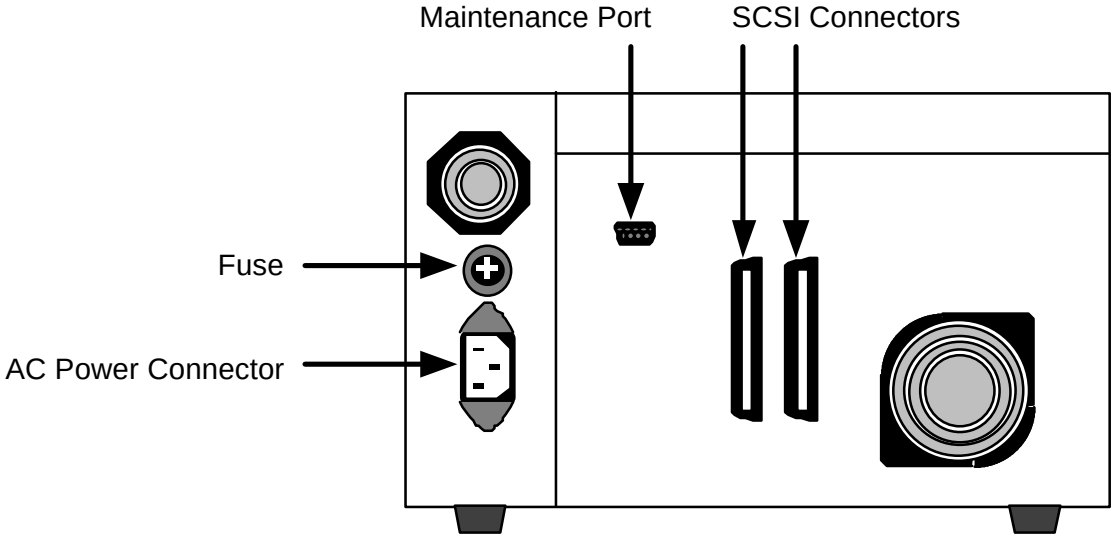


Figure 2-4 Rear View of the Drive

2.2.3 Display

The 16-character 2-line alphanumeric LCD display with backlight on the front operator panel displays various messages regarding drive operation and status.

The upper row of the display is called the “Status-Line”. It displays status information, error codes, etc.. The lower row of the display is called the “Switch-Line”. Operation switch functions are displayed here. Furthermore, the combination of the Status-Line and Switch-Line is referred to as the “Menu-Display”.

The message of the display using both upper and lower row is called the “2-Line-Message”. This message is only displayed temporarily (approx. 3 sec.).

Various “Status-Line” displays are explained in Table 2-2, 2-3 and 2-4. Various “2-Line-Message” displays are explained in Table 2-5.

Table 2-2 “Status-Line” Display (Part 1)

	Display	Description
Drive Status	ENABLE	The drive is powering up and running the diagnostics.
	LOADING	The drive is loading.
	REWINDING	The drive is rewinding.
	UNLOADING	The drive is unloading.
	CLEAN	The drive requires cleaning with a cleaning cartridge.
	CLEANING	The drive is being cleaned with the cleaning cartridge.
	POWER-ON RELOAD	After again turning on the power, the drive is reloading the inserted cartridge.
	POWER-ON UNLOAD	After again turning on the power, the drive is unloading the inserted cartridge.

Table 2-3 "Status-Line" Display (Part 2)

	Display	Description
On-line Status	STAND BY 18	This drive is only for 18-track cartridge. [MS-8418] The cartridge is not loaded. The drive will be ready after loading.
	STAND BY 18w/36	This drive is set to the write operation for 18-track. The cartridge is not loaded. [MS-843x] The drive will be ready after loading. < Option >
	STAND BY 18/36w	This drive is set to the write operation for 36-track. The cartridge is not loaded. [MS-843x] The drive will be ready after loading. < Option >
	STAND BY 36	This drive is only for 36-track cartridge. [MS-843x] The cartridge is not loaded. The drive will be ready after loading.
	BOT ONLINE WE	Loaded cartridge is write enable. The drive is ready for on-line operation. Tape is positioned at BOT.
	BOT ONLINE FP	Loaded cartridge is write protected (file protected). The drive is ready for on-line operation. Tape is positioned at BOT.
	BOT■■■ EOT	The cartridge is loaded and in use. The drive is ready for on-line operation. Tape is not positioned at BOT. The "■" mark indicates amount of tape used.
Off-line Status	OFFLINE UNLOADED	The cartridge is not loaded. The drive is not-ready for off-line operation.
	BOT OFFLINE WE	Loaded cartridge is write enable. The drive is not ready for off-line operation. Tape is positioned at BOT.
	BOT OFFLINE FP	Loaded cartridge is write protected (file protected). The drive is not ready for off-line operation. Tape is positioned at BOT.
	OFFLINE WE	The drive is not ready for off-line operation. Tape is not positioned at BOT.

Table 2-4 "Status-Line" Display (Part 3)

	Display	Description
Off-line Status	ONL AFTER REWIND	The drive is rewinding. The drive will be ready when complete.
	UNLOAD AFTER REW	The drive is unloading.
Setup Mode	SCSI ID 5	"SCSI ID" Setup menu. (for example; SCSI ID=5)
	MENU FUNCTIONS	Setup mode. (Menu functions)
	CONFIGURE	Configuration menu.
	DIAGNOSTICS	Diagnostics menu.
	STATISTICS	Statistics menu.
	ENTER PASSWORD	Request for password entry.
	SAVE SETUP ?	Input request to save in this menu.
	ARE YOU SURE ?	Input request to confirm in this menu.
	Refer to items of each menu for details on the setup mode.	
Error	WRT PROTECT 1018	Cannot write to write protected cartridge.
	18Thin Tape 1026	18-track format cannot write to extended cartridges.
	INVALID PASSWORD	Entered password is invalid.
	DIAGNOSTIC ERROR	Error detected during powering up diagnostics.
	Refer to Chapter 5 for details on errors with the lighted ALERT indicator.	

Table 2-5 "2-Line-Message" Display

	Display	Description
	DIAGNOSTICS COMPLETED OK	Powering up diagnostics have successfully completed.
Setup Mode	WILL SAVE SETUP IN FLASH ROM	Can save to Flash-ROM.
	SETUP SAVED IN FLASH ROM	Saved to Flash-ROM.
	NO CHANGES TO CONFIG SETUP	Cannot change setup.
	WILL SAVE SETUP UNTIL POWER DOWN	Settings can be used until turning off power.
	SETUP SAVED UNTIL POWER DOWN	Settings stored until turning off power.
	MUST POWER DOWN BEFORE EFFECTIVE	Turn off the power.
	DON'T POWER DOWN	Do not turn off the power.

2.2.4 Operation Switch

The 3 button type switches on the front operator panel are used to control the drive. Operation switch function are displayed on the lower row (Switch-Line) of the display. Follow the display to operate the 3 switches.

Pressing a switch changes the display contents of the menu. The Switch-Line will then display new switch functions according to the new menu. In other words, switch functions change every time a switch is pressed. Relationship of the position between the Switch-Line and the switches are explained in Figure 2-5. The function of the switches are explained in Table 2-6.

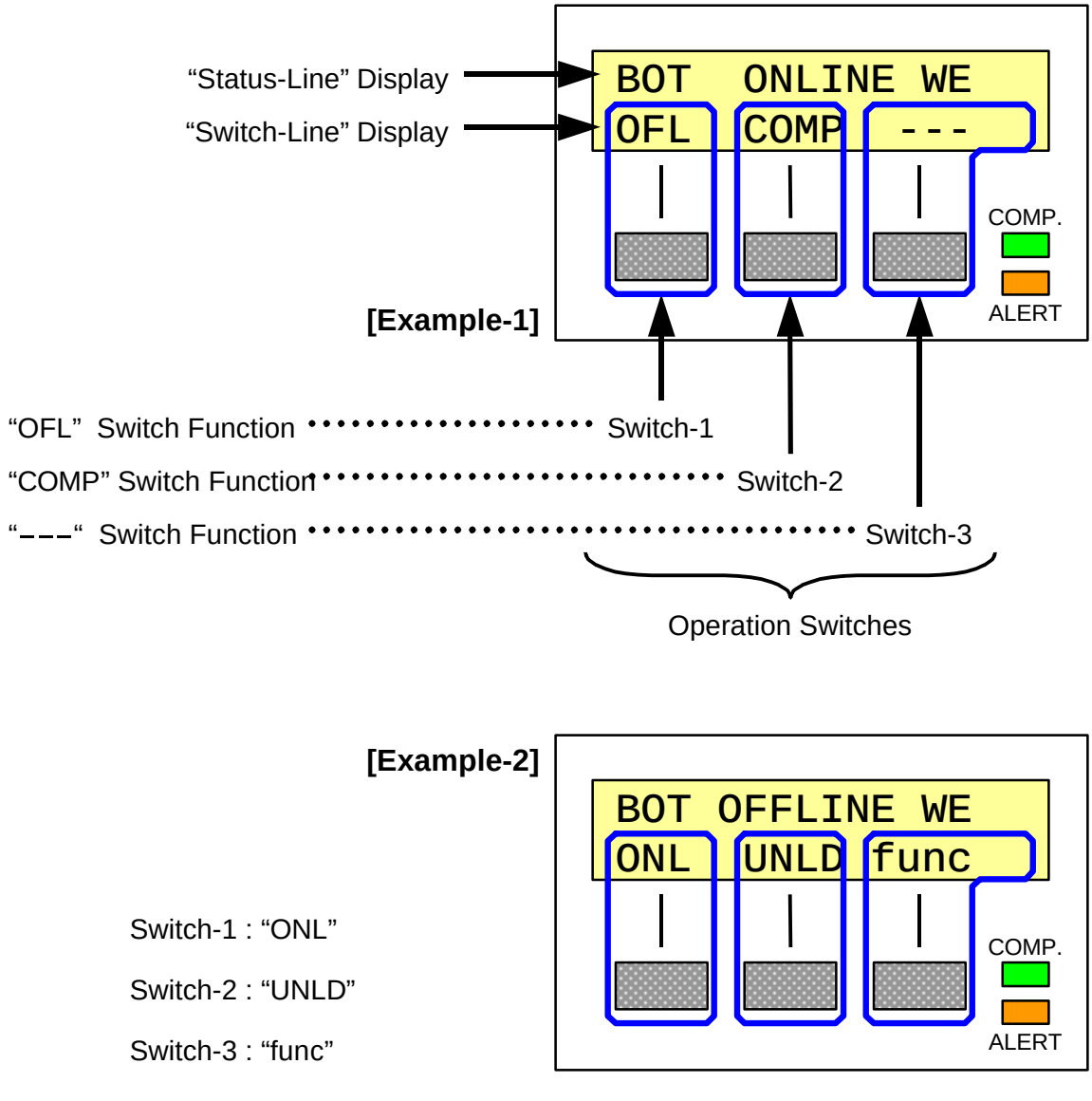


Figure 2-5 Relationship of "Switch-Line" Positions

NOTE

The display of each function is punctuated with 1 or more blank spaces.

Table 2-6 "Switch-Line" Display and Switch Function

	Display	Switch Function
Common	---	The switch is not defined.
	>>>	Change to the next menu.
	EXIT	Exit menu of the current layer.
	YES	Permit input request of the Status-Line.
	NO	Decline input request of the Status-Line.
	TEMP	Temporarily use input request of the Status-Line.
On-line	OFL	Enter the off-line operation.
	COMP	Switch the data compression mode.
Off-line	ONL	Return to the on-line operation.
	REW/UNL	Rewind.
	UNLD	Unload.
	DEN	The write operation can be switched for 18/36 track drive.
	func	The "SCSI ID" setup.
"SCSI ID" Setup	func	The setup mode.
	CHG	Change the "SCSI ID".
	EXIT	Return to the on-line operation.
Setup Mode	CONF	The configure mode.
	DIAG	The diagnostics mode.
	STAT	The statistics mode.
	FUNLD	Recover from servo error.
	CHG	Change setup.
	NEXT	Advance to the next display.
	Refer to items of each menu for details on the setup mode.	

2.2.5 Indicator

The 2 indicators on the front operator panel show the drive status. The conditions for the indicators lighting are explained in Table 2-7.

Table 2-7 Indicators

Indicator	Color	Description
COMP.	Green	When the LED is lighted, the drive writes in the compressed mode(IDRC). When the LED is not lighted, the drive writes in the uncompressed mode. This LED indicates the writing mode and does not reflect the read mode.
ALERT	Red	This LED is lighted when an error is detected. At this time, error code etc. will be displayed on the Status-Line (upper row).

2.3 Powering Up

2.3.1 Installing Cables and Interfaces

Connect the attached AC power cable to the AC power connector located on the rear panel, then insert the plug to an AC power outlet.

Refer to section 4.1 and connect the SCSI cable to the SCSI connector.

2.3.2 Turning in the Power

Turn the power switch on the front panel from off [**O**] to on [**|**] (Refer to Figure 2-2) to supply AC power to the drive. The backlight of the operator panel display will light (yellow).

Self-diagnostics will be executed for approximately 20 seconds after turning the drive on. During this time, “ENABLE...” will be displayed on the Status-Line of the display and communication with interface and operator panel operations are disabled.

“STAND BY” is displayed on the Status-Line of the display when the self-diagnostics is successfully complete and use of the drive is enabled. If an error has been detected during the self-diagnostics, the ALERT indicator will light and an error message will appear on the display.

CAUTION

When turning off the power, wait at least 10 seconds before turning the power back on.

2.3.3 On-line Mode / Off-line Mode

There are 2 types of operating modes: the on-line mode and off-line mode. The on-line mode displays an on-line status on the Status-Line, indicating that the drive is ready. The off-line mode displays an off-line status on the Status-Line, indicating that the drive is not ready. Refer to Table 2-3.

The operation mode (on-line / off-line) can be switched using the operation switch on the front panel. Figure 2-6 shows the procedure to switch from the on-line mode to the off-line mode. Figure 2-7 shows the procedure to switch from the off-line mode to the on-line mode.

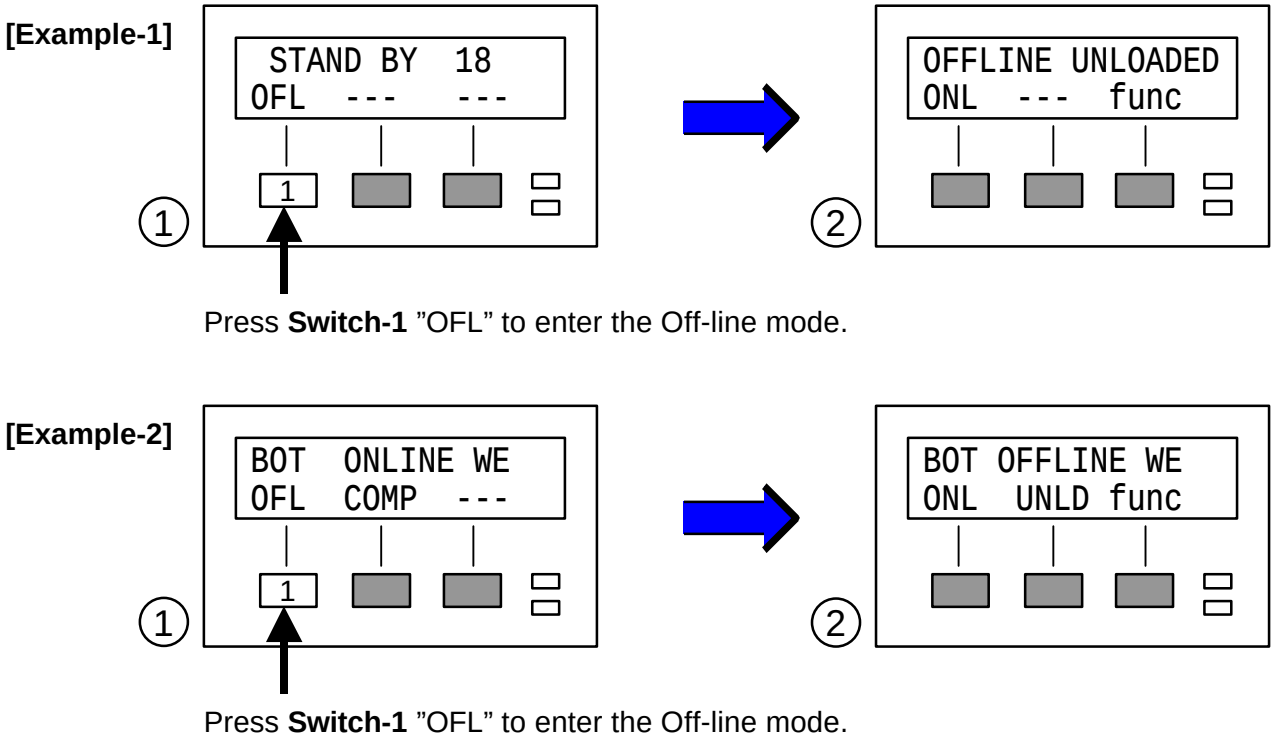


Figure 2-6 On-line Mode to Off-line Mode

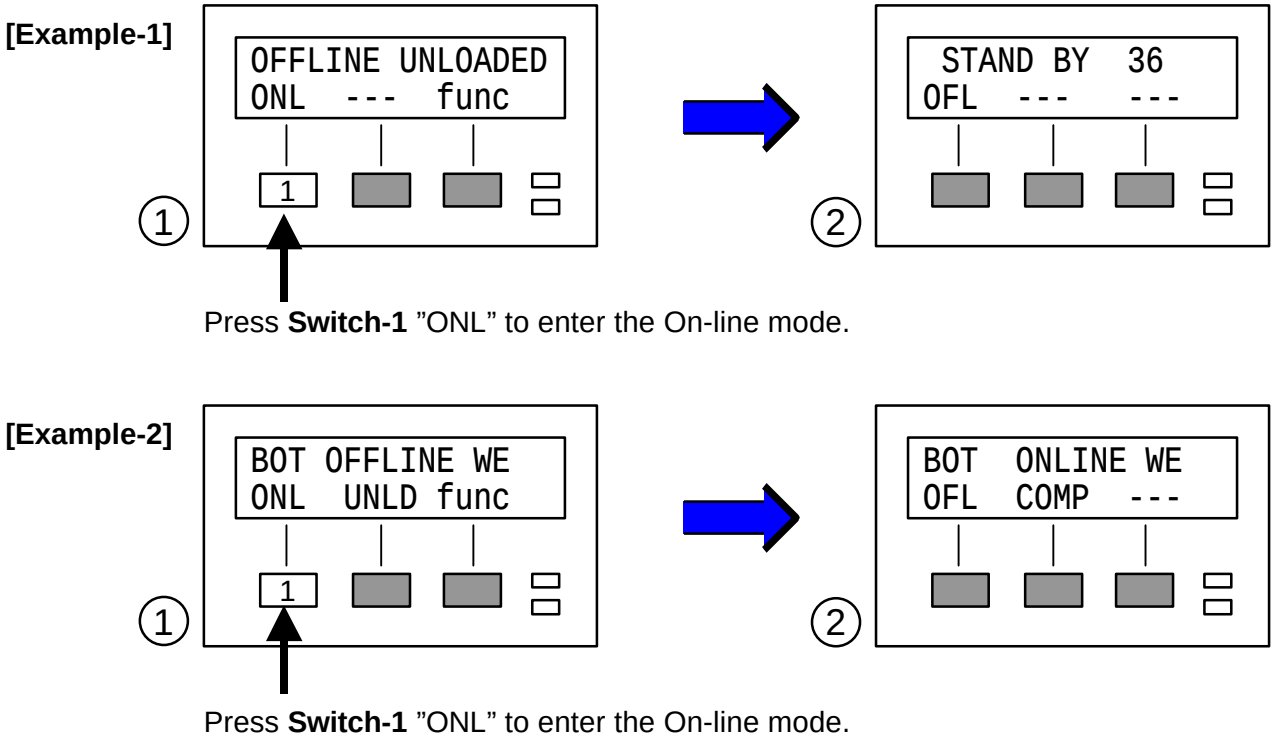


Figure 2-7 Off-line Mode to On-line Mode

During the on-line mode, tapes can be read/write when a cartridge is loaded. The off-line mode enables unload and drive setup.

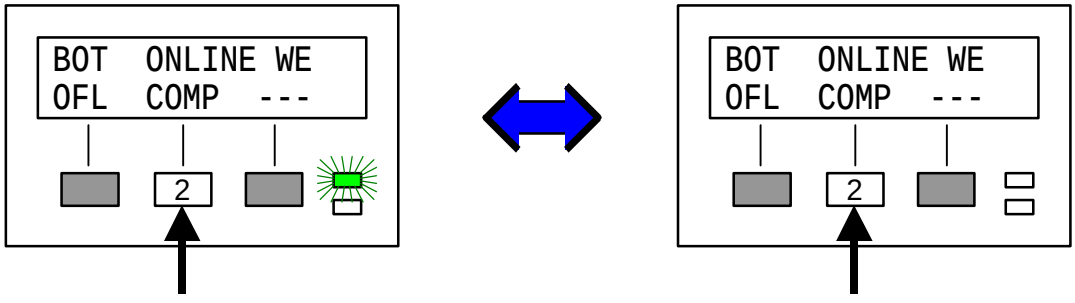
2.3.4 Switching the Recording Format

When the operation mode is in the on-line mode and when a cartridge is loaded, recording format can be switched to uncompressed or compressed. Switching of recording format is valid only tape positioned at BOT with write enable status and switching is automatic when reading data. The COMP indicator also shows the recording format during writing of data.

When the COMP indicator is lit, the drive will write in compressed format. Pressing the center Switch-2 “COMP” will turn off the indicator and the drive will write in uncompressed format. Refer to the left side of Figure 2-8.

When the COMP indicator is not lit, the drive will write in uncompressed format. Pressing the center Switch-2 “COMP” will turn on the indicator and the drive will write in compressed format. Refer to the right side of Figure 2-8.

[Compressed Recording Format] **[Uncompressed Recording Format]**



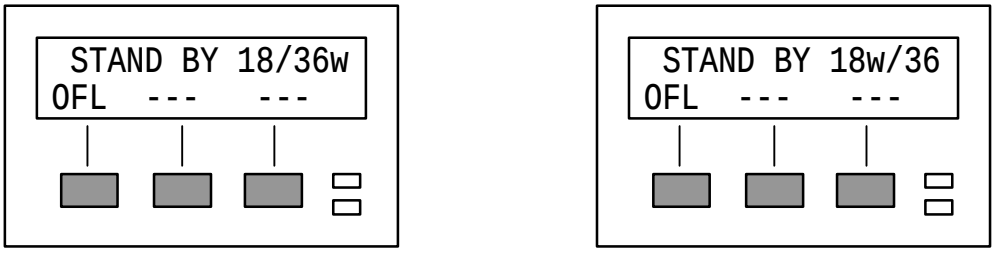
Press **Switch-2** ”COMP” to switch between uncompressed and compressed.

Figure 2-8 Switching the Recording Format

2.3.5 Switching the Write Operation [for 18/36 track drive only]

With 18/36 track drive, it is possible to switch between the 18-track and 36-track write operation using the operation switches on the front of the operator panel.

The current write operation can be determined when “STAND BY” is displayed on the center of the Status-Line. When “18/36w” is displayed on the right of the Status-Line, the 36-track write operation is selected. When “18w/36” is displayed on the right of the Status-Line, the 18-track write operation is selected. In other words, the letter “w” following the number of tracks indicates which operation is selected. Refer to Figure 2-9.



[36-track Write Operation] **[18-track Write Operation]**

Figure 2-9 Current Write Operation

CAUTION

The 18-track write operation of the 18/36 track drive is IBM compatible but does not conform to ANSI. Use caution when exchanging data with the drives of other companies.

The following procedure to change the “Write Operation Setup”. Refer to Figure 2-10.

1) First, unload the cartridge. If the operation mode is in the on-line mode, change to the off-line mode. Refer to Figure 2-6.
2) “DEN” will be displayed on the center Switch-Line of the display. Pressing the center Switch-2 “DEN” displays the current write operation on the Status-Line of the display. This menu is the Write Operation setup.
3) To change the Write Operation, pressing the center Switch-2 “CHG” each time displays another Write Operation on the Status-Line.

   When “WRITE 18” is displayed on the center of the Status-Line, the 18-track write operation is selected. When “WRITE 36” is displayed on the center of the Status-Line, the 36-track write operation is selected.

   When “TRACK” is displayed on the right of the Status-Line, the SCSI command is enabled the write operation to change. When “(FORCE)” is displayed on the right of the Status-Line, the SCSI command is disabled the write operation to change.
4) To complete the setup, press the left Switch-1 “EXIT”. “SAVE SETUP?” will be displayed on the Status-Line.
5) Press the Switch-1 “YES” to save the current setup.

   Press the Switch-2 “NO” to abort and use the previous setup.

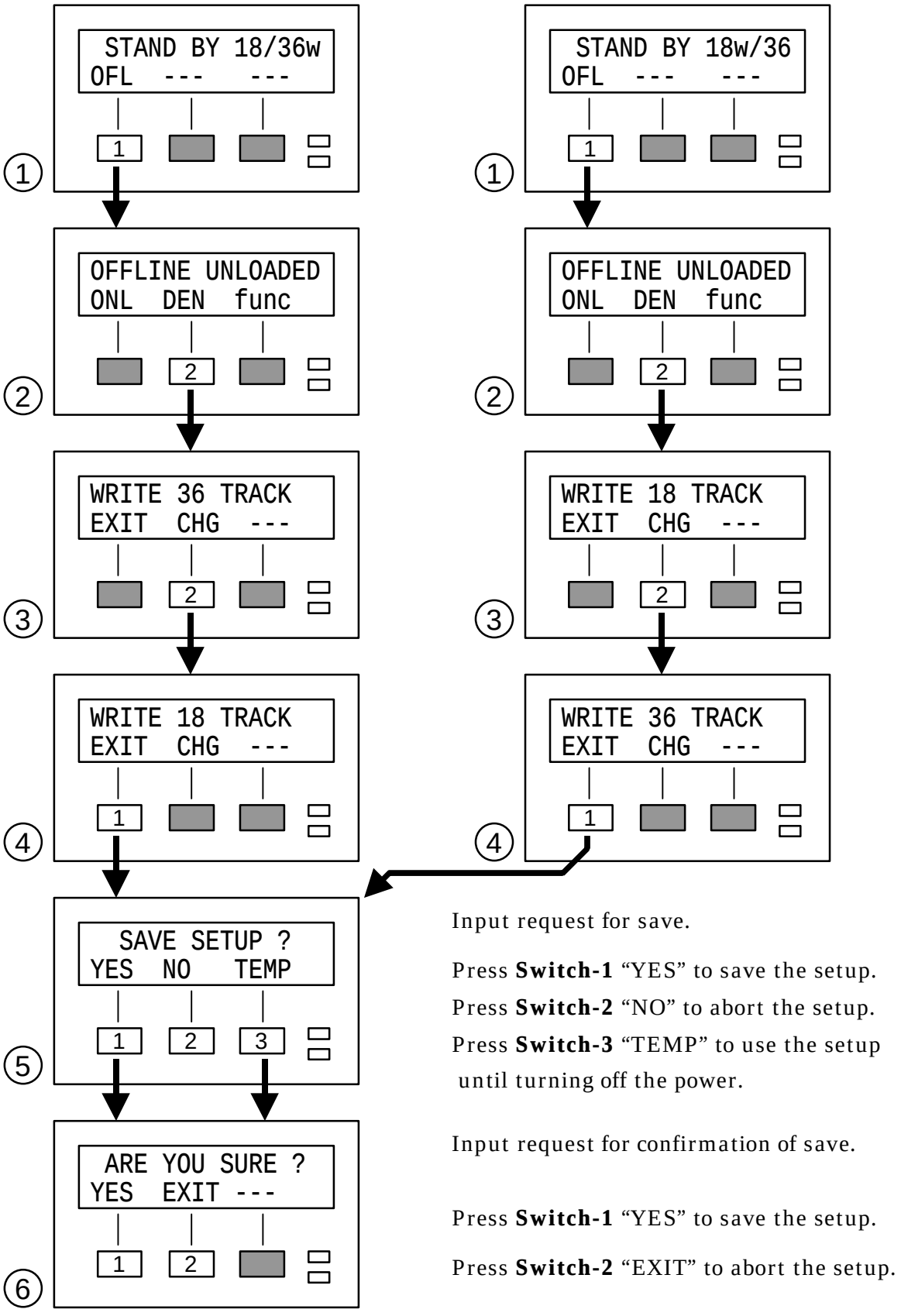
   Press the Switch-3 “TEMP” to use the current setup until turning off the power.

   Pressing the Switch-2 returns this menu. Pressing the Switch-1 or Switch-3 “ARE YOU SURE ?” will be displayed on the Status-Line.
6) Press the Switch-1 “YES” to save the current setup.

   Press the Switch-2 “EXIT” to abort and use the previous setup.

   Pressing either switch, this menu will be exited and the off-line mode will return.

[Changing to 18-track Write Operation] **[Changing to 36-track Write Operation]**



Input request for save.

Press **Switch-1** "YES" to save the setup.
Press **Switch-2** "NO" to abort the setup.
Press **Switch-3** "TEMP" to use the setup until turning off the power.

Input request for confirmation of save.

Press **Switch-1** "YES" to save the setup.

Press **Switch-2** "EXIT" to abort the setup.

Figure 2-10 Write Operation Setup

2.4 Loading a Cartridge

Before loading a cartridge, make sure that the write protect selector is on either write enable (white dot not showing) or write protected (white dot showing). Refer to Figure 2-1.

NOTE

The write protect selector on the cartridge protects data from being overwritten. When the write protect selector is on the write protect position, the white dot (key mark) on the flat side of the selector will be visible from the side of the cartridge.

First, enter the on-line mode if in the off-line mode (Refer to Figure 2-7). "STAND BY" will be displayed on the center Status-Line of the display.

Insert the cartridge facing in the correct direction (leading block away from you) into the cartridge slot, as shown in Figure 2-11. Insert cartridge slowly and completely until hitting the wall beyond the tray. The drive will then automatically lower the tray and load the cartridge. "LOADING" will appear on the Status-Line when loading.

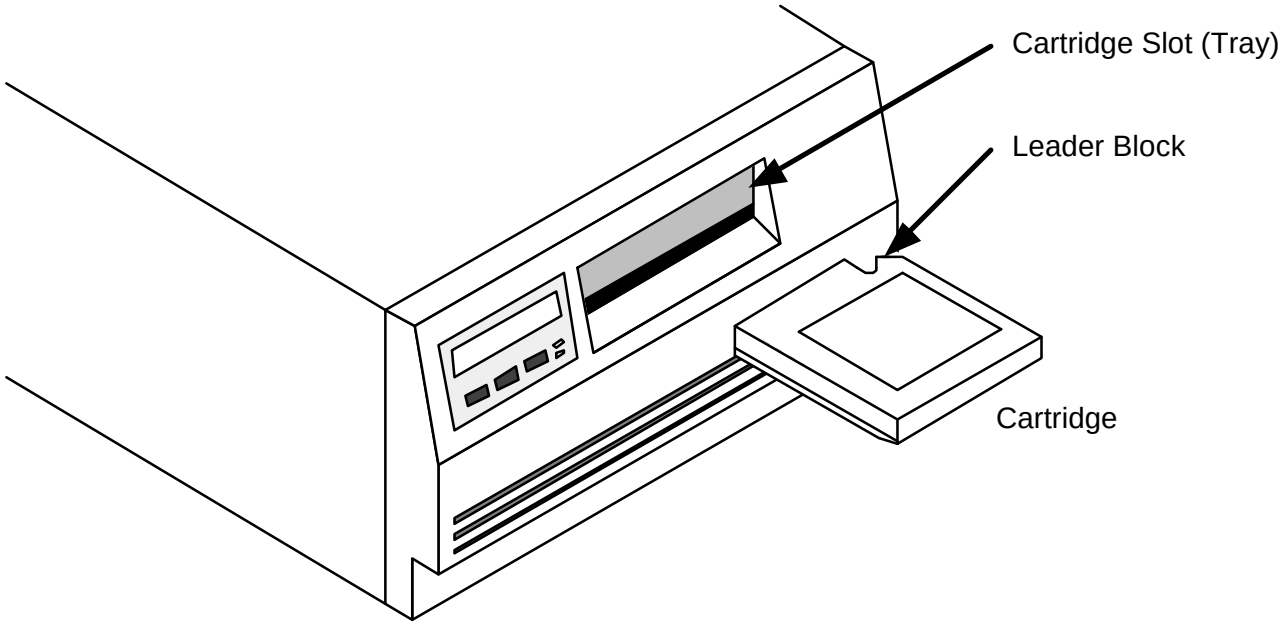
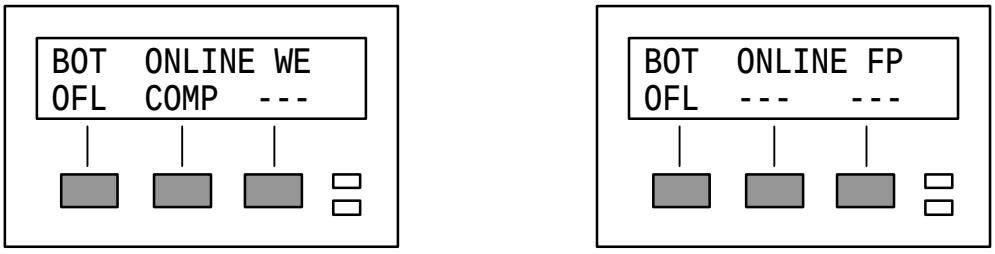


Figure 2-11 Loading a Cartridge

"ONLINE" will appear on the center of the Status-Line when loading is complete and drive will be ready. The drive is now read/write enabled. Refer to Figure 2-12.



[Write Enable] **[Write Protected]**

Figure 2-12 Completion of the Loading

2.5 Unloading the Cartridge

2.5.1 Manual Unloading

First, enter the off-line mode if in the on-line mode (Refer to Figure 2-6). "OFFLINE" will be displayed on the center Status-Line of the display.

"REW/UNL" or "UNLD" is displayed on the center of the Switch-Line. Pressing the center Switch-2 "REW/UNL" during when the display is "REW/UNL" rewinds the tape and the display changes to "UNLD". Pressing Switch-2 "UNLD" at this time unloads the cartridge. Pressing the center Switch-2 "UNLD" when "UNLD" is displayed unloads the cartridge immediately. Refer to Figure 2-13.

"UNLOADING" or "UNLOAD AFTER REW" will appear on the Status-Line when unloading, and the drive will become not ready. When the tray is lifted and cartridge is ejected, "STAND BY" is displayed on the Status-Line and unloading is complete.

2.5.2 Unloading from SCSI

Set the operation mode to on-line and execute the SCSI Unload Command from the host computer.

"UNLOADING" will appear on the Status-Line of the display when unloading, and the drive will become not ready. When the tray is lifted and cartridge is ejected, "STAND BY" is displayed on the Status-Line and unloading is complete.

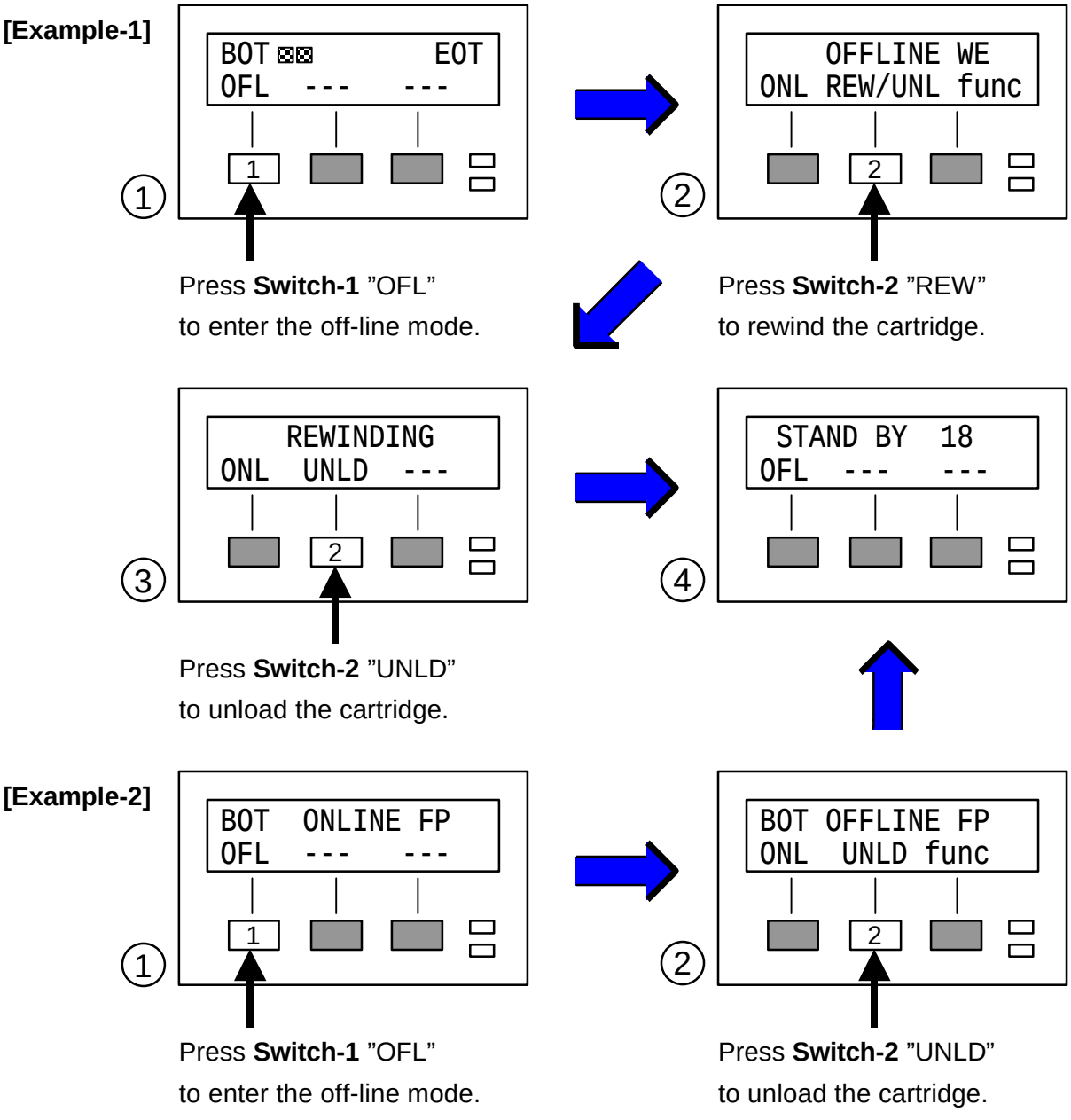


Figure 2-13 Unloading the Cartridge

CAUTION

If the drive is to be relocated or reshipped, unload and remove the cartridge first. If a drive is transported with the cartridge still inserted, the media could be damaged, resulting in loss data.

Chapter 3 MAINTENANCE

This drive is designed for maintenance free, except as follows.

3.1 Cleaning the Tape Head

Clean the tape head and path using the IBM 3480 cleaning cartridge (IBM P/N 4780527 or compatible).

This cleaning operation should be performed periodically to help prevent read or write errors. The tape head and path should be cleaned every 8 hours during continuous operation. They should be cleaned at least once a day, even if the operation is not continuous.

Clean the tape head and path immediately if the operator panel display the “CLEAN” message on the Status-Line of the display. This message is displayed only when rewinding, loading or unloading.

Follow the manufacturer’s recommendations for the use of the cleaning cartridge and keep track of the number of uses.

WARNING!

Do not clean the tape head directly with cotton swabs etc.. The tape head of the drive may be destroyed due to its thin coating structure, if the receiving force exceeds the pressure of prescription (tape tension).

Load the cleaning cartridge into the drive as with standard cartridges (Refer to Section 2.4). The drive automatically initiates cleaning when the cartridge is loaded. The cartridge is automatically unloaded when cleaning is complete.

NOTE

When cleaning is complete, the “CLEAN” display will be replaced by the standard Status-Line display.

Marking the top face label of a cleaning cartridge whenever cleaning has finished is convenient to keep track of the number of uses.

3.2 Repairing the Leader Block

Although not often, the leader block may sometimes separate from the tape. If this occurs, reattaching the leader block to recover previously recorded data is permitted one time.

CAUTION

The following procedure is only permitted when the cartridge contains important data that needs to be recovered. The leader block attachment is a temporary part permitted to recover data one time.
After reattaching the leader block and transferring the contained important data to a computer, destroy the cartridge.

The leader block of the cartridge can be reattached easily by using the leader block attachment kit (IBM P/N 4780625). This kit contains a leader block, leader block pin and clutch tool. To reattach leader block, remove tape from the cartridge then attach the leader block to the tape in a straight line. The leader block insert kit (IBM P/N 4780624) containing only a leader block and leader pin is also available. For procedure on the repair, refer to the instructions enclosed with either kit.

CAUTION

Always use the clutch tool to replace the leader block.

NOTE

For repair kits, contact the cartridge manufacturer.

Chapter 4 INSTALL and SETUP

4.1 Installation

4.1.1 Installation Procedure

Use the following procedure to install this drive. For details, refer to the "Installation Notes" of the host computer.

1) Install the drive in a safe place. Do not connect the SCSI cables yet.
2) Operate the host computer and search for a vacant SCSI ID number.
3) Stop the host computer system and turn off the power supply.
4) Connect the AC power cable and SCSI terminator to the drive. (Refer to section 4.1.3.)
5) Turn on the drive power supply. (Refer to section 2.3.2.)
6) Set the drive SCSI ID to the vacant number, and set the emulation mode, etc., to match those of the host computer system. (Refer to section 4.2.)
7) Turn off the drive power supply. (Refer to section 2.3.2.)
8) Connect the host computer system and the drive. (Refer to section 4.1.3.)
9) Turn on the drive power supply and then start the host computer system.
10) Operate the host computer and register the drive.

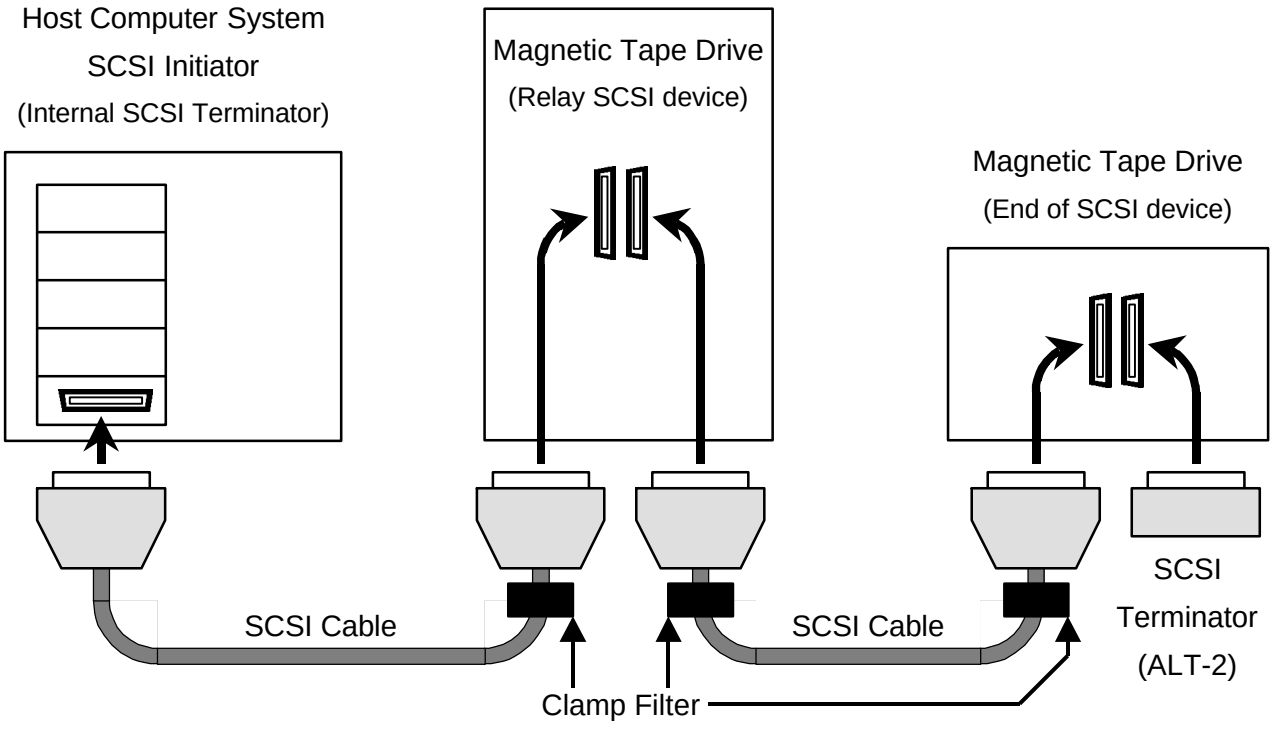
4.1.2 Installation Precautions

Observe the following precautions during installation.

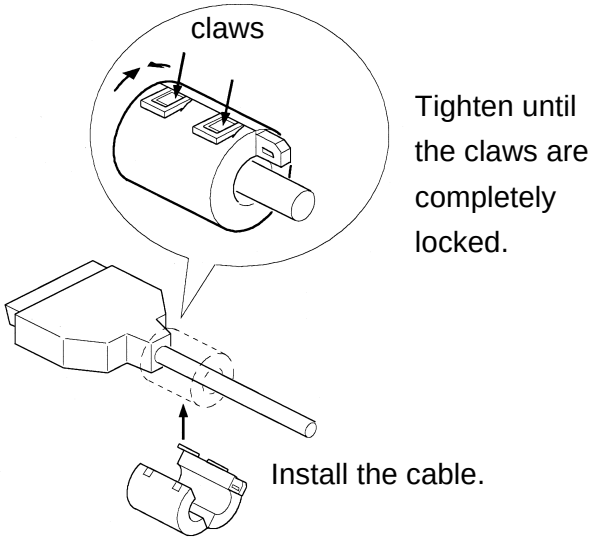
1) The host computer system should be operated by the systems manager.
2) The SCSI cable should be the minimum possible length. Also, use high-impedance shielded cable.
3) Always install a SCSI terminator at both ends of the SCSI system being connected. Also, use an active SCSI terminator (ALT-2) for single-end SCSI model.
4) Do not turn off the drive power supply while the host computer system is in use.
5) After turning off the drive power supply, wait at least 10 seconds before turning the power supply on again.

4.1.3 SCSI Cable Connection

The two SCSI connectors on the rear panel of the drive can be used for either input or output. Refer to Figure 4-1 and connect the SCSI cables and the SCSI terminator. Also install a clamp filter on the SCSI cable and fasten it at the end near the SCSI connector of the drive.



Clamp Filter Installation



Fastening the Clamp Filter

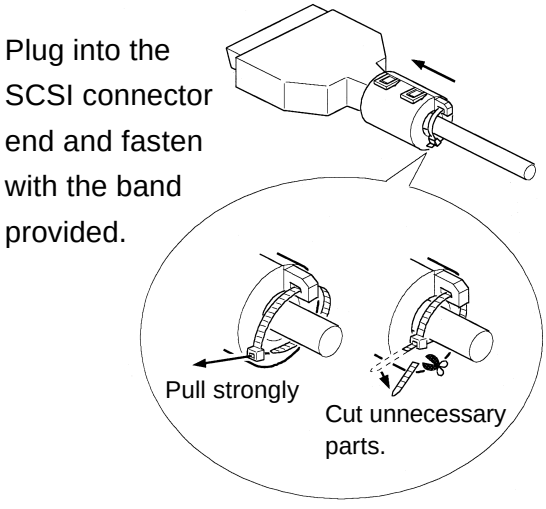


Figure 4-1 SCSI Cable Connection

4.2 Setup

This drive can be set up from the operator panel on the front.

Table 4-1 shows the standard setup values. Also, when changing the standard setup values, enter the changes in this table for reference. (Refer to section 4.4 for the values that can be set.)

Table 4-1 Setup Values

Contents		Standard Setup Value		Currently Set Value	Comments
Type	Items	MS-8418	MS-843x		
SCSI	SCSI ID	5			
	WIDE NEGT	SCSI-2 model : DSABL SCSI-3 model : ENABL			
	SYNC NEGT	ENABL			
	SAVE PNTR	ENABL			
	LD/RWD STAT	OFLN			
	BUFER MODE	buff			
	FMK SYNC	all			
	BOT PRE-RD	norm			
	WR RETRIES	10			
	RD RETRIES	10			
DRIVE	COMPRESSION	OFF	ON		
	COMP SWITCH	ON			
	TAPE PWR-ON	UNLD			
	EMULATION	ECHO			
	DEFALT CFG	FLASH			
	WRT ERR	norm rec			
	PERM RD ERR	norm			
	ERSE W2 DID	---	norm		
	Rd AHEAD FMK	go			
18WRT	WRITE	---	36 TRACK		18/36 track model.
UCODE	CURRENT CNTL	Enter when the firmware is updated.		MEC	
	CURRENT FORM			MEF	
	CURRENT SCSI			MES	
	CURRENT SERVO			MEV	

4.2.1 SCSI ID Setup

CAUTION

The power supply of the drive must be turned off when changing the SCSI ID setup, so operate it independently without connecting to the host computer system.

The following procedure to set the "SCSI ID setup". Refer to Figure 4-2.

1) First, unload the cartridge. If the operation mode is in the on-line mode, change to the off-line mode. Refer to Figure 2-6.
2) "func" will be displayed on the right Switch-Line of the display. Pressing the right Switch-3 "func" displays the current "SCSI ID" on the Status-Line of the display. This menu is the SCSI ID setup.
3) To change the SCSI ID, pressing the center Switch-2 "CHG" each time increases SCSI ID number on the right of the Status-Line. SCSI ID can be any number from 0 to 15. (The numbers from 8 to 15 are reserved for use with SCSI-3=WIDE SCSI.)
4) To complete the setup, press the right Switch-3 "EXIT". "SAVE SETUP?" will be displayed on the Status-Line.
5) Press the Switch-1 "YES" to save the current setup.

   Press the Switch-2 "NO" to abort and use the previous setup.

   Pressing the Switch-2 returns the SCSI ID setup menu. Pressing the Switch-1 "ARE YOU SURE ?" will be displayed on the Status-Line.
6) Press the Switch-1 "YES" to save the current setup.

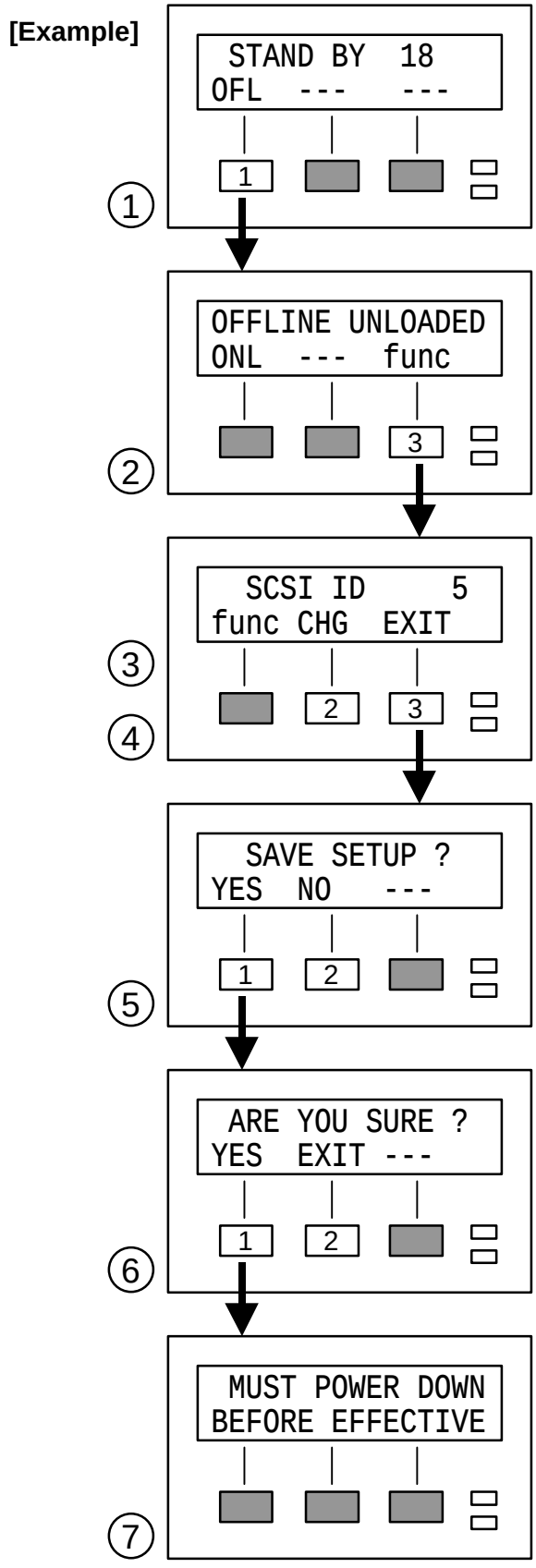
   Press the Switch-2 "EXIT" to abort and use the previous setup.

   Pressing either switch returns the SCSI ID setup menu.
7) Turn off the power when changing the setup.

   When not changing the setup, press the right Switch-3 "EXIT" to return to the off-line mode.

CAUTION

New setup will not be valid unless turning off the power.



Off-line mode menu.

Press **Switch-3** "func".

SCSI ID setup menu.

Press **Switch-2** "CHG" to increase SCSI ID.

Press **Switch-3** "EXIT" to end the setup.

Input request for save.

Press **Switch-1** "YES" to save the setup.

Press **Switch-2** "NO" to abort the setup.

Input request for confirmation of save.

Press **Switch-1** "YES" to save the setup.

Press **Switch-2** "EXIT" to abort the setup.

Turning off the power.

Figure 4-2 SCSI ID Setup

4.2.2 Emulation Mode Setup etc.

Enter the configuration mode when changing “SCSI” or “DRIVE” setup. These setup menus will be displayed on the Status-Line when the correct password is entered.

The following procedure to set a example of “Emulation Mode setup”. Refer to Figure 4-3.

1) First, if the operation mode is in the on-line mode, change to the off-line mode. Refer to Figure 2-6.
2) “func” will be displayed on the right Switch-Line of the display. Pressing the right Switch-3 “func” displays the current SCSI ID on the Status-Line of the display.
3) Pressing the left Switch-1 “func” displays “MENU FUNCTIONS” on the Status-Line.
4) Select the menu displayed as “CONF” on the left of the Switch-Line. Pressing the left Switch-1 “CONF” displays “ENTER PASSWORD” on the Status-Line. This is the password input prompt.
5) Press Switch-3,-2 and -3 in sequence. The “CONFIGURE” will appear on the Status-Line. This menu is the configuration mode.
6) Select the menu displayed as “DRIVE” on the center of the Switch-Line. Pressing the center Switch-2 “DRIVE” displays the current “COMPRESSION” on the Status-Line. This menu is the IDRC default setup.
7) Press the right Switch-3 “>>>” to select the menu that displays the current “EMULATION” on the Status-Line. This menu is the Emulation Mode setup.
8) To change the Emulation Mode, pressing the center Switch-2 “CHG” each time displays the other mode on the Status-Line.
9) To complete the setup, press the left Switch-1 “EXIT”. “SAVE SETUP?” will be displayed on the Status-Line.
10) Press the Switch-1 “YES” to save the current setup.

    Press the Switch-2 “NO” to abort and use the previous setup.

    Press the Switch-3 “TEMP” to use the current setup until turning off the power.

    Pressing the Switch-2 returns the configuration mode. Pressing the Switch-1 or Switch-3 “ARE YOU SURE ?” will be displayed on the Status-Line.
11) Press the Switch-1 “YES” to save the current setup.

    Press the Switch-2 “EXIT” to abort and use the previous setup.

    Pressing either switch returns the configuration mode.
12) Press the right Switch-3 “>>>” to select the menu that displays “EXIT” on the Switch-Line. Press this “EXIT” switch to return to the off-line mode.

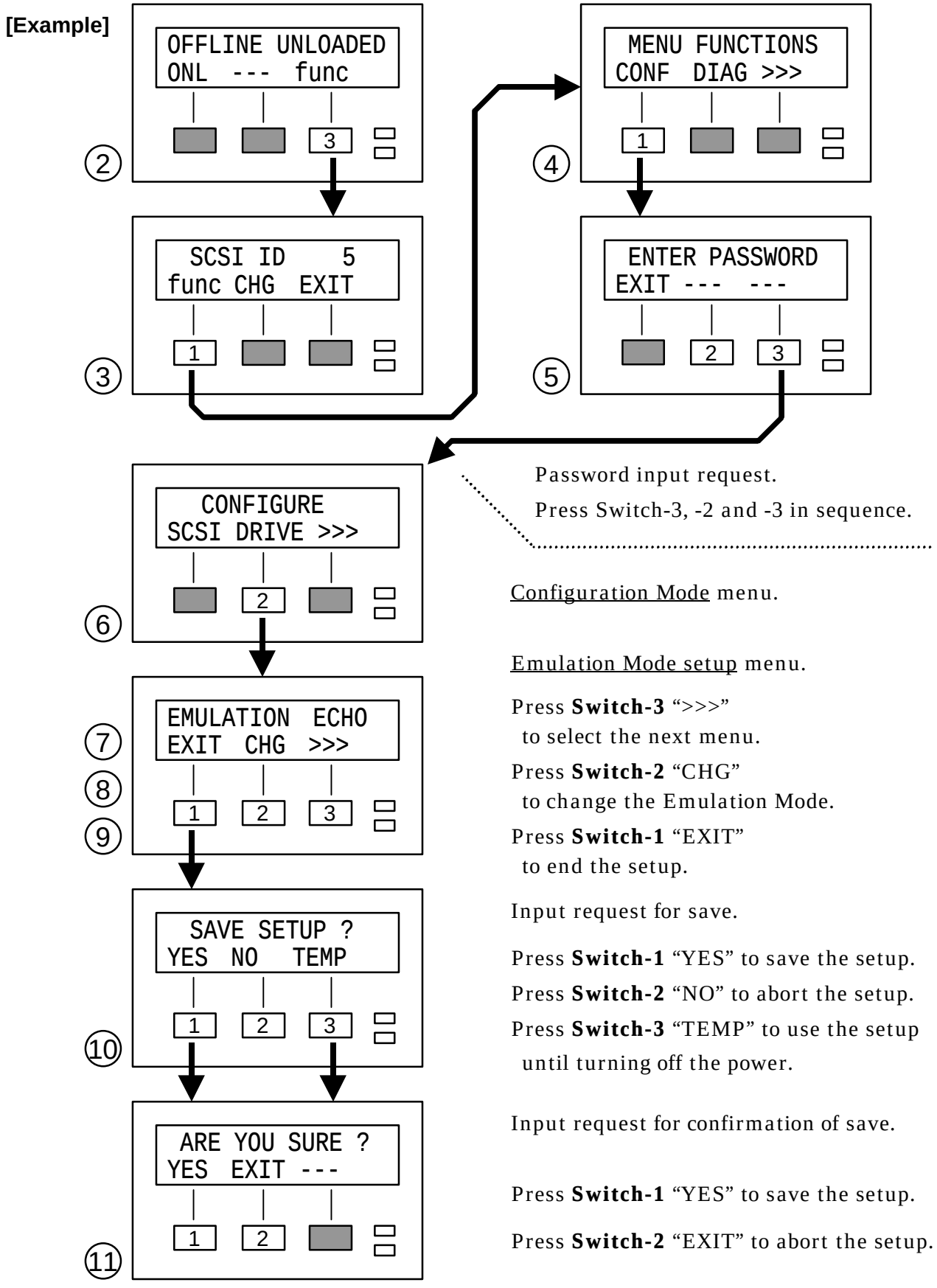


Figure 4-3 Emulation Mode Setup

4.3 Diagnostics

Enter the diagnostics mode when execute the self-diagnostics for read/write. A password is requested only when selecting “SERVO” in the diagnostics mode. The setup menu will be displayed on the Status-Line when the correct password is entered.

The following procedure to set a example of “Write-Test”. Refer to Figure 4-4.

1) First, load a write-enabled cartridge. If the operation mode is in the on-line mode, change to the off-line mode. Refer to Figure 2-6.
2) “func” will be displayed on the right Switch-Line of the display. Pressing the right Switch-3 “func” displays the current SCSI ID on the Status-Line of the display.
3) Pressing the left Switch-1 “func” displays “MENU FUNCTIONS” on the Status-Line.
4) Select the menu displayed as “DIAG” on the center of the Switch-Line. Pressing the center Switch-2 “DIAG” displays “DIAGNOSTICS” on the Status-Line and enters the diagnostics mode.
5) Select the menu displayed as “RWT” on the center of the Switch-Line. Pressing the center Switch-2 “RWT” displays “READ/WRITE TESTS” on the Status-Line.
6) Press the right Switch-3 “>>>” to shift to the next menus.
7) Select the menu displayed as “WRT” on the left of the Switch-Line. Pressing the left Switch-1 “WRT” displays “WRITE TEST” on the Status-Line. This menu is the Write-Test.
8) Press the Switch-1 “SHORT” to execute the Short Write-Test.

   Press the Switch-2 “LONG” to execute the Write-Test to EOT.

   Pressing either switch displays “NUM REC =” on the center of the Status-Line and initiates writing of test data to the tape.
9) “DIAG PASSED” is displayed on the center of the Status-Line when successfully completing the Write-Test. Refer to Chapter 5 if an error is returned.
10) Press the right Switch-3 “>>>” to select the menu that displays “EXIT” on the Switch-Line. Press this “EXIT” switch to close to each of the menus.

CAUTION

Test data is written to the tape during Write-Test. Thus, data of the cartridge used for Write-Test is destroyed.

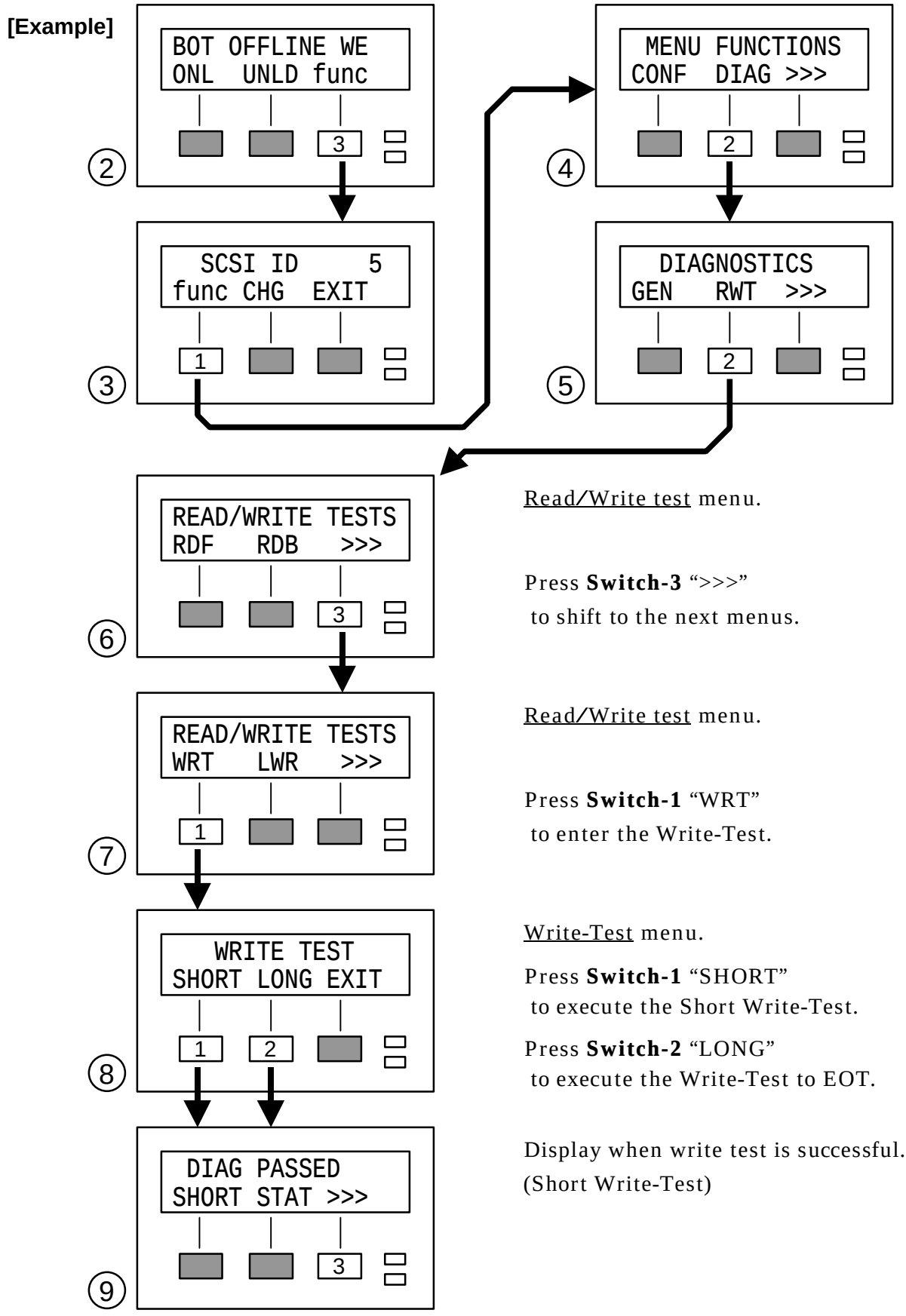
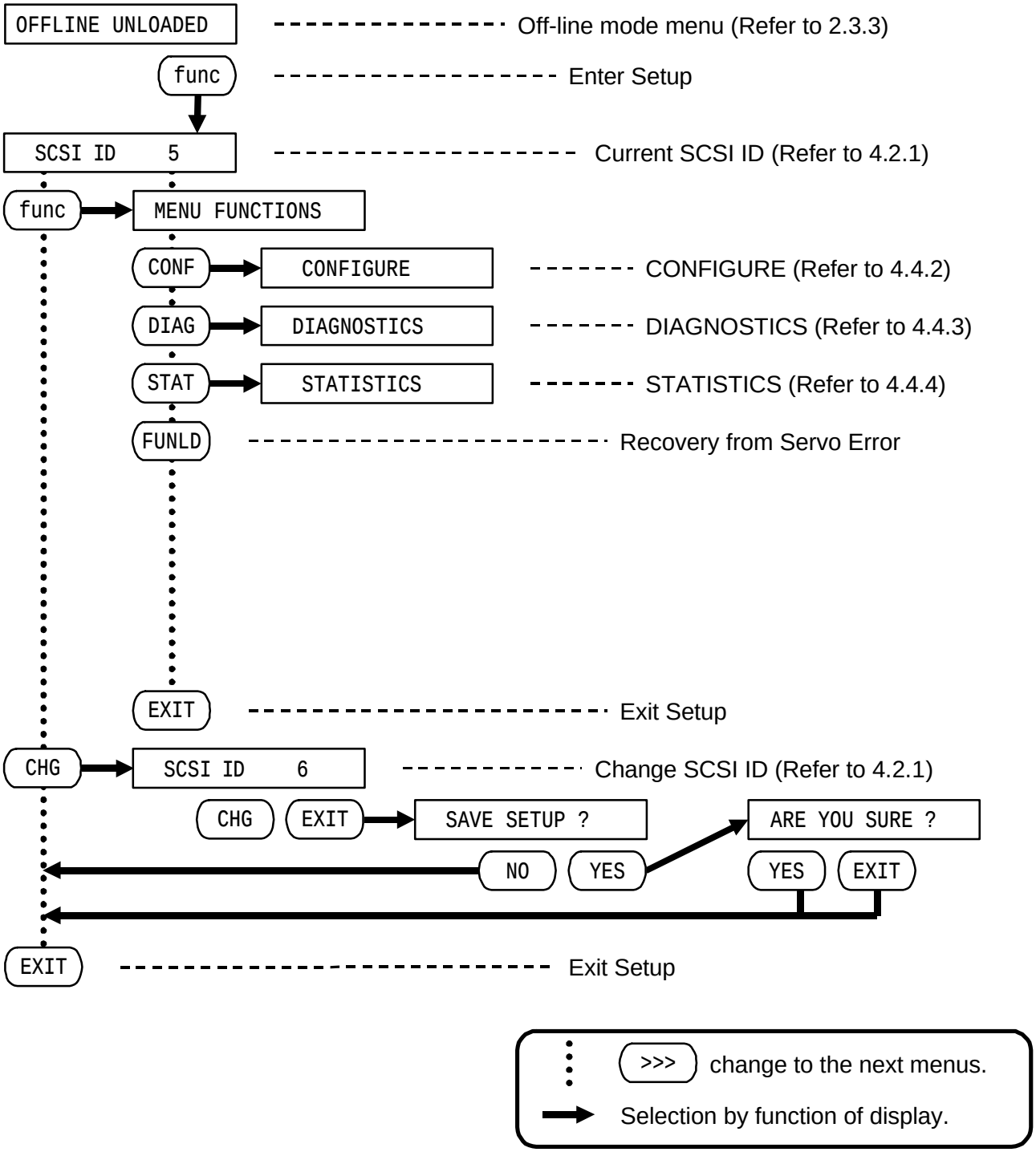


Figure 4-4 Write-Test Procedure

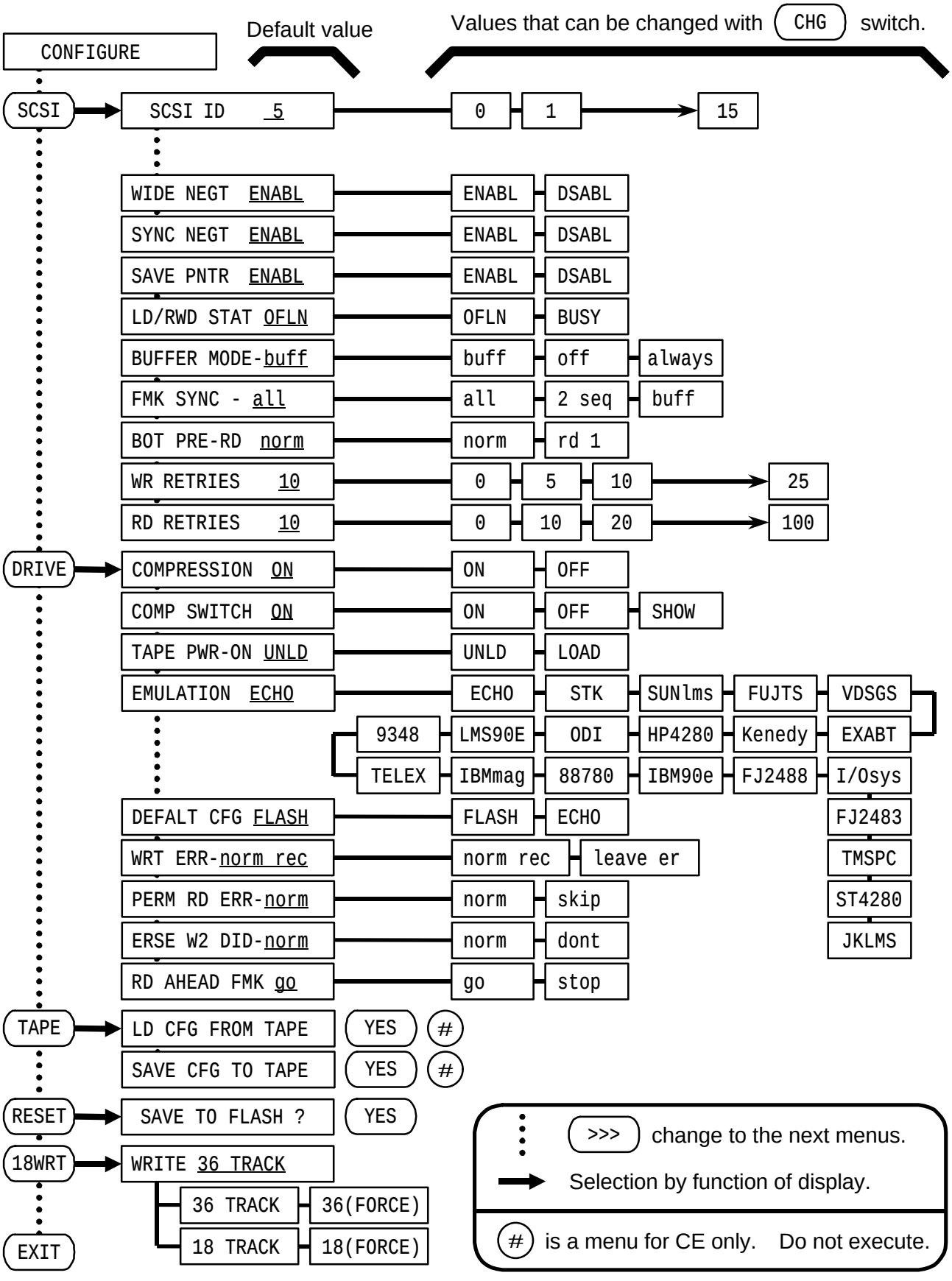
4.4 Hierarchic Structure of Setup

Listing of setup is given below. Items for CE (Customer Engineer) are to be performed only by persons with maintenance training.

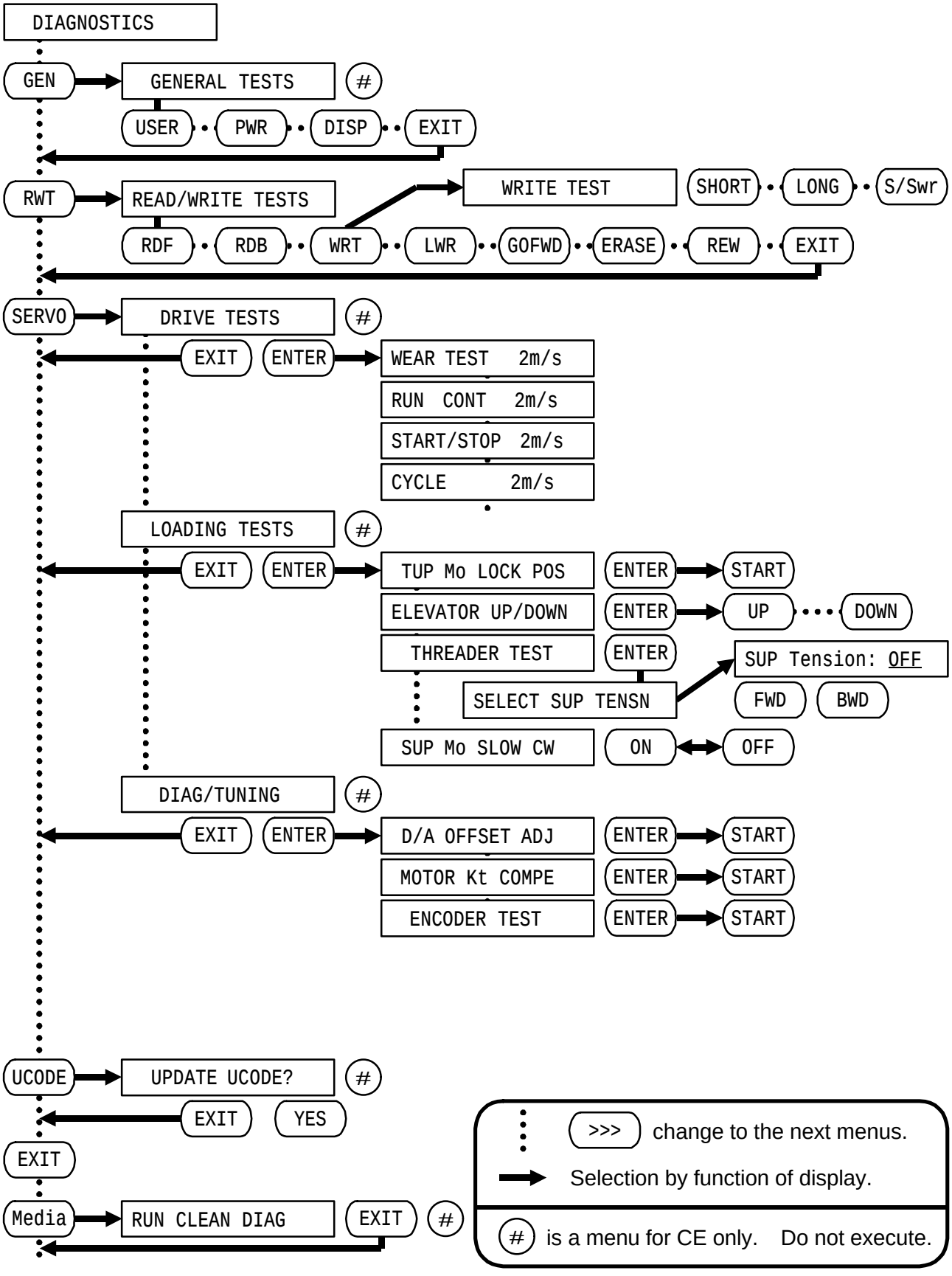
4.4.1 General Structure



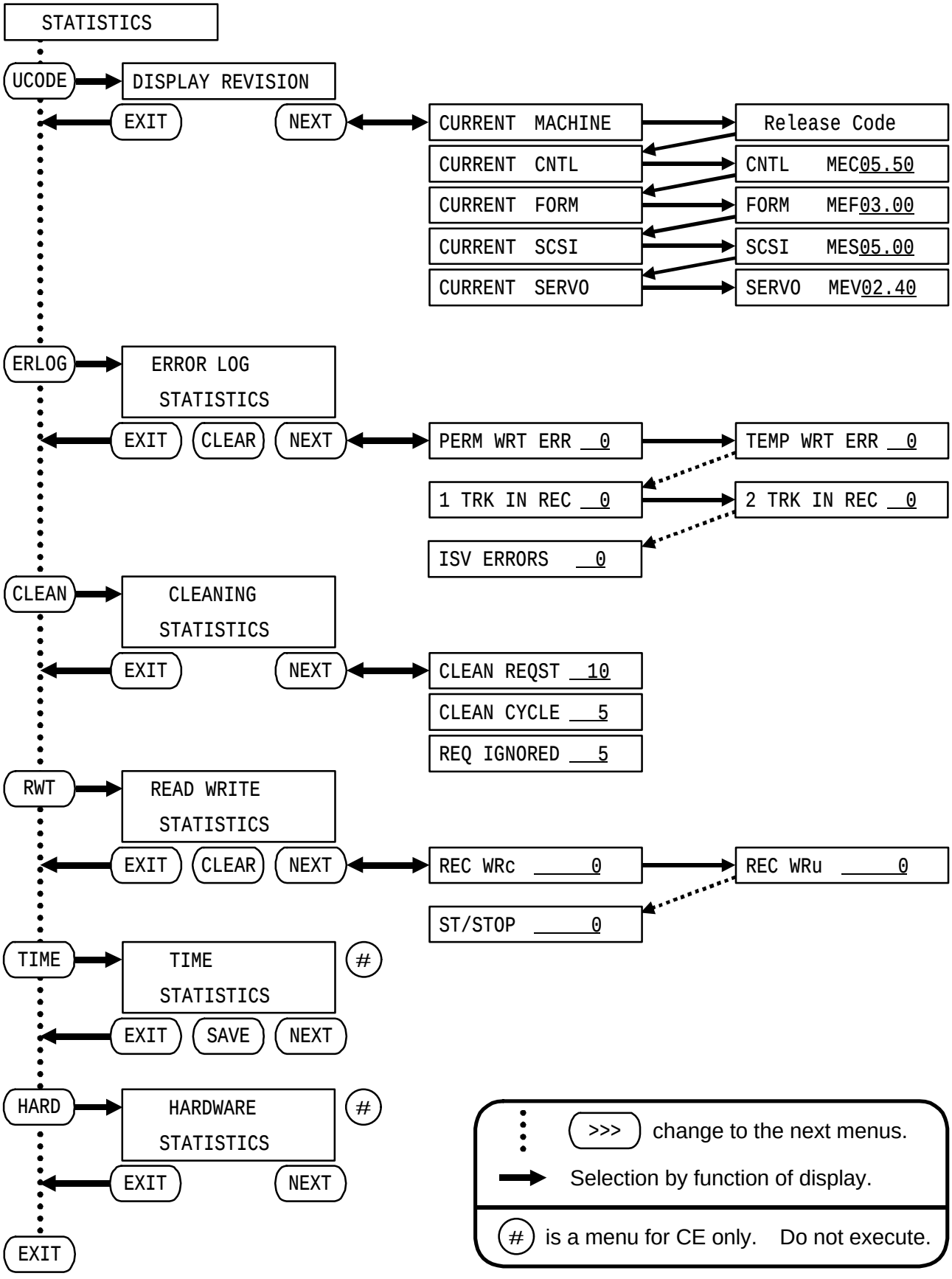
4.4.2 Structure of CONFIGURE



4.4.3 Structure of DIAGNOSTICS



4.4.4 Structure of STATISTICS



[Notes]

Chapter 5 TROUBLE SHOOTING

When a malfunction occurs in this drive, operate the drive based on the directions indicated in this chapter. When a problem cannot be solved or if there is some point that is unclear, please contact the service department.

5.1 Error Display

Electrical and mechanical errors can be detected by an internally equipped microprocessor. The error description can also be detected for the magnetic tape media.

When an error is detected, the ALERT indicator on the front operator panel lights and an error message or an error code are displayed on the Status-Line of the display. The error code is displayed as 4 decimal digits from the right side of the Status-Line.

CAUTION

The drive may not operate correctly if the setup for this drive is not executed correctly. The error code is not displayed at this time. Execute the setup operation so the drive corresponds to the host computer system that is connected. (Refer to section 4.2.)

An error code is also not displayed when there is a problem with the SCSI cables or SCSI terminators connected to the drive. Check the SCSI bus system. (Refer to section 4.1.)

5.2 Countermeasures

When an error occurs, first make a note of the error code. Next, refer to the error code and execute the appropriate countermeasure operations.

5.2.1 Error Codes

The error descriptions are shown in Table 5-1 and the error processing procedures are shown in Table 5-2.

The procedure used to eliminate errors is shown below.

1) The error is eliminated if the rewind or unload operations are executed.

If the error cannot be eliminated, execute the following procedures.

2) Unload the cartridge. When the unload operation cannot be executed, turn off the power one time.
3) When turning the power on again, wait more than 10 seconds.

CAUTION

Consult the system manager when turning off the power to the drive. There is a possibility of damaging the applications of the host computer system that is connected.

Table 5-1 4 digit Error Codes

Error Code	Error Description	Processing
1018	Cannot write to write protected cartridge.	Unload the cartridge.
1026	Cannot write to an extended cartridge.	Operations B, E, C, G.
1xxx	A command from the host computer system could not be executed.	Operations B, F, D, G.
2xxx 4xxx	The control circuit board detected an error.	Operations C, D, F, G.
3003 3004	A cartridge was read that contained no data.	Rewind the cartridge.
3107	The number of tracks is different than the specifications.	Rewind the cartridge.
	An unrecognized cartridge was read.	Operations A, B, C, G.
3xxx	Position of the tape was read which did not contain recorded data.	Rewind the cartridge.
	A write operation to the tape or a read operation from the tape could not be executed.	Operations A, B, C, G.
5xxx	A failure occurred in a load operation.	Operations E, B, C, G.
	A failure occurred in an unload operation.	
	The servo circuit board detected an error.	
Others	Something may be damaged.	Operations E, C, D, G.

Marks : “xxx” as the numeric value of an optional 3 digits.

5.2.2 Error Processing

The countermeasures (operations A to G) for each type of error are shown in table 5-2. When the countermeasures are specified a multiple number of times, execute these operations in the specified sequence. If the error is eliminated, it is not necessary to execute the remaining countermeasures.

Table 5-2 Error Processing

Error Processing	Countermeasure
A	Use a cleaning cartridge and clean the tape head and tape path. (Refer to section 3.1.)
B	Replace the other cartridges. The following conditions may apply to these cartridges. 1) The number of tracks differs from the drive specifications. (Read operations.) 2) The tape length differs from the drive specifications. 3) An unrecognized cartridge is loaded. (Read operations.) 4) The tape may be used out of the range of required operation temperature. 5) Logical damage has occurred to the tape such as write operation residue. 6) Physical damage such as a crack is present on the tape.
C	Turn the power off one time. Wait at least 10 seconds before turning the power back on again.
D	Turn the power off and check the SCSI bus connections. Wait at least 10 seconds before turning the power back on again. (Refer to section 4.1.)
E	Make sure that there are no abnormalities in the cartridge. The following conditions may apply to these cartridges. 1) The cartridge insertion direction may be reversed. 2) The leader block is open. 3) There is a problem in the cartridge label. 4) Refer to section 2.1 for a description of other problems.
F	Check the setting values for the setup. (Refer to section 4.2.)
G	It is possible that the drive is damaged. (Refer to section 5.2.3.)

5.2.3 Service Calls

When error processing “G” in Table 5-2 is used, note the error code displayed on the operator panel display of the front panel and call the service department. Use the form on the this page to enter the error codes and types.

Model Name	
Serial Number	

Date	Error Code	Type of Operations	Error Description	Error Processing