EXB-8500 8mm Cartridge Handling Subsystem

MID-TAPE WAKE-UP Command (1Bh)

Exabyte®

510208-000

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Introduction

This document describes the MID-TAPE WAKE-UP (1Bh) command for the EXABYTE® EXB-8500 8mm Cartridge Tape Subsystem (EXB-8500). You can use this document as a supplement to the *EXB-8500 Cartridge Tape Subsystem User's Manual* (part number 510201).

About This Command

The MID-TAPE WAKE-UP command is an EXABYTE-unique command that is implemented using the vendor unique feature of the SCSI LOAD / UNLOAD command.

Important

MID-TAPE WAKE-UP is an optional command requiring a special EEPROM image from EXABYTE. This EEPROM image is not included in standard EXB-8500s. If your EXB-8500 includes the special mid-tape wake-up EEPROM, other EEPROM options are not available; instead, the EXB-8500 is shipped in a standard configuration.

The MID-TAPE WAKE-UP command provides a second power-on mode that enables the EXB-8500 to recover from a powered-off state faster than it can in its normal power-on mode. Specifically, the MID-TAPE WAKE-UP command allows an EXB-8500 to power on without reloading the tape or repositioning the tape to LBOT.

To shorten the power-on sequence further in mid-tape wake-up mode, an EEPROM option allows you to request a full or an abbreviated RAM test of the 1-MByte data buffer when the EXB-8500 is powered on in mid-tape wake-up mode. Since the integrity of any data transferred through the buffer cannot be guaranteed if the RAM is not tested, this option is designed for applications where you want to continue capturing data even if a portion of the buffer fails.

Mid-tape wake-up mode is designed for special applications that require battery operation, such as remote site data logging. Typically, these type of applications collect data and then periodically write that data to tape. To reduce the drain on the batteries, you can turn off the EXB-8500 until you are ready to transfer data. Then, when you power on the EXB-8500, you can quickly locate the tape to the last saved logical position before power off.

Command Descriptor Block

The command descriptor block for the MID-TAPE WAKE-UP (1Bh) command is shown below.

Bit Byte	7	6	5	4	3	2	1	0
00	0	0	0	1	1	0	1	1
01	Logical Unit Number			Reserved				Immed
02	Reserved							
03								
04	Reserved					MTW Function		
05	MTW	VU	Reserved				0	0

Field Definitions

Byte 01, Bit 0 - Immed

The Immed bit is used to determine when command status is returned to the initiator, as follows:

0 – Status is reported to the initiator when the mid-tape wake-up operation is complete.

1 – Status is reported to the initiator when the command is initiated by the EXB-8500.

Note: To ensure that meaningful results are obtained, do not set the Immed bit for mid-tape wake-up mode. Unless command status is returned when the command is completed, you would not be able to determine when it is safe to power off the CTS.

Byte 04, Bits 2 through 0 - MTW Function

The MTW (mid-tape wake-up) Function field indicates which mid-tape wake-up function you want to perform with this CDB. Table 1 indicates what function occurs based on the setting of this field.

Table 1 Mid-tape wake-up functions

Setting of MTW Function field	Name of function	Description of mid-tape wake-up function
000b	Sleep	Prepare for power-off. Save the tape's current logical position in the EEPROM and release the tension on the tape.
001b	Wake Up	Move the tape to the logical position saved by the last Sleep or Set Up function executed before power off.
010b	Set Up	Enable mid-tape wake-up mode and record the tape's current logical position in the EEPROM. **Note:** Even though the EEPROM is set for mid-tape wake-up, the EXB-8500 will act just like a normal EXB-8500 until you enable mid-tape wake-up mode by issuing a MID-TAPE WAKE-UP command with the MTW function field set to Set Up.
011b	Unload Now	Unload the data cartridge without rewinding the tape. **Note:** When you issue a MID-TAPE WAKE-UP command with the MTW Function field set to 011b, the EXB-8500 does not empty the data buffer, write an EOD mark, or rewind the tape before it unloads the data cartridge. For this reason, only use this function if absolutely necessary. This function is provided for applications that cannot afford the power and time needed to write an EOD mark and rewind the tape after data logging is complete. It allows the tape to be unloaded from the tape path and wound back into the cartridge immediately. A tape created with this function does not contain an EOD mark; therefore, high speed search operations cannot be reliably performed near the end of the data.

Setting of MTW Function field	Name of function	Description of mid-tape wake-up function
101b	Finish	Disable mid-tape wake-up mode. Issuing a MID-TAPE WAKE-UP command with the MTW Function field set to 101b returns the EXB-8500 to its normal operating mode.
100b	Reserved	These bit settings are reserved. If you set the MTW Function field to one of these values
110b		
111b		

Byte 05, Bit 7 - MTW

This bit distinguishes between the LOAD / UNLOAD command and the EXABYTE-unique MID-TAPE WAKE-UP command, as follows:

0 – This is a LOAD / UNLOAD command (refer to the *EXB-8500 User's Manual*).

1 – This is the EXABYTE-unique MID-TAPE WAKE-UP command.

Byte 05, Bit 6 - Vendor Unique

There are no vendor unique definitions for this bit.

Using Mid-Tape Wake-Up Mode

Important

Because mid-tape wake-up mode allows tapes to be created without an EOD mark, you should use a new or erased tape. Otherwise, high-speed search operations cannot be reliably performed near the end of the data on a tape written in mid-tape wake-up mode.

Starting Mid-Tape Wake-Up Mode

To use mid-tape wake-up mode, follow these steps:

1. Initialize a tape for mid-tape wake-up data logging by loading a blank data cartridge and writing two long filemarks.

   This ensures that the tape contains a valid LBOT area and is logically positioned at a mid-tape wake-up splice point. A mid-tape wake-up splice point consists of two long filemarks with no intervening data.

2. Issue a MID-TAPE WAKE-UP command with the MTW Function field set to 010b (Set Up).

   This activates mid-tape wake-up mode and causes the EXB-8500 to save the tape's current logical position in the EEPROM.

3. Write data to tape as you normally would.

4. When you are ready to power off the EXB-8500, write two long filemarks to the tape.

   This provides a splice point that will be used when you resume write operations.

5. Issue a MID-TAPE WAKE-UP command with the MTW Function field set to 000b (Sleep).

   This saves the tape's current logical position in the EEPROM and causes the drum to release tape tension.

6. As soon as the EXB-8500 returns Good status, power the EXB-8500 off.

   The EXB-8500 does not rewind the tape, write an EOD mark, or flush the buffer.

Waking Up the EXB-8500 and Resuming Data Logging

When you are ready to resume data logging activities, follow these steps:

1. Power the EXB-8500 back on. The EXB-8500:

   a. Performs a controller bootcode ROM self-test.

   b. Performs a servo system self-test. The tape load / unload activities are suppressed.

   c. Restores SCSI variables to their power-on defaults.

   d. Tests the 1-MByte buffer.

      In mid-tape wake-up mode, an abbreviated RAM test is the default, although an EEPROM option lets you choose between a full RAM test or an abbreviated RAM test.

2. Issue a TEST UNIT READY (00h) command to ensure that the EXB-8500 is ready. The EXB-8500 will respond with Check Condition status.

3. Issue a REQUEST SENSE (03h) command to report and clear the Unit Attention (6h) sense key.

4. Issue a MID-TAPE WAKE-UP command with the MTW Function field set to 001b (Wake Up). The EXB-8500:

   a. Re-tensions the tape path and moves the tape back 50 tracks.

   b. Spaces backward at 1.5 times the normal tape speed, if necessary, to position the tape in front of the last saved logical position in the EEPROM.

      This motion is necessary to recover from an unexpected power failure during data logging.

c. Reads forward at normal read speed. The EXB-8500 logically positions the tape between the two filemarks written when you prepared the EXB-8500 for power off (see step 4 in the previous section). During this read operation, EXB-8500 recalibrates its adaptive servo parameters.

5. Issue a WRITE or WRITE FILEMARKS command to resume data logging. The EXB-8500 will overwrite the second of the two long filemarks.

Returning to Normal Power-On Mode

If the EXB-8500 is in mid-tape wake-up mode and you want to begin using normal power-on self-test mode, issue a MID-TAPE WAKE-UP command with the MTW Function field set to 101b (Finish).

Time Required for Mid-Tape Wake-Up Mode

Using mid-tape wake-up mode lessens the time it takes the EXB-8500 to become ready to write data to tape after power on.

In normal power-on mode, the EXB-8500 performs a full RAM test of the 1-MByte buffer and rewinds the tape to LBOT. These activities take a minimum of 55 seconds to complete.

In mid-tape wake-up mode, the EXB-8500 performs either a full or an abbreviated RAM test (whichever you specify in the EEPROM option) and, rather than rewinding the tape to LBOT, logically positions the tape between the two filemarks written before the EXB-8500 was powered off. With a full RAM test, the EXB-8500 takes 45 seconds to become ready. With an abbreviated RAM test, the EXB-8500 takes 25 seconds to become ready.

Adding Mid-Tape Wake-Up Capability to an EXB-8500

If you want to add mid-tape wake-up capability to an EXB-8500, you can receive a special microcode load tape from EXABYTE. This load tape causes the EEPROM to be initialized for mid-tape wake-up use. The initialized EEPROM has the count of mid-tape wake-up sleep / wake-up cycles set to 0.

Note: For instructions on using a microcode load tape, see the *EXB-8500 User's Manual*.

A mid-tape wake-up EXB-8500 will issue a warning after approximately one million sleep / wake-up cycles. After this warning, the EEPROM will continue to function until it becomes unreliable. To avoid using an unreliable EEPROM, be sure that the EEPROM is replaced by qualified service personnel after each one million sleep / wake-up cycles.

Note: The power-on default for removing a cartridge from an EXB-8500 with a mid-tape wake-up EEPROM is to inhibit removal. If you want to remove the cartridge from the EXB-8500, issue a PREVENT / ALLOW MEDIUM REMOVAL command with the Prevent bit set to 0.

Exceptions and Error Conditions

The following exceptions and error conditions can occur with the EXABYTE-unique MID-TAPE WAKE-UP command.

Illegal Request

If you issue an invalid MID-TAPE WAKE-UP command, the EXB-8500 terminates the command and returns Check Condition status. The sense key indicates Illegal Request (5h). As shown in Table 2, indicators in the extended sense data can be used to isolate the error.

Table 2 Extended sense data for mid-tape wake-up Illegal Request conditions

ASC	ASCQ	FSC	Description of error
24h	00h	5Bh	You have issued a MID-TAPE WAKE-UP command with the MTW Function field set to a reserved value (for valid values, see Table 1).
2Ch	00h	50h	You have issued a MID-TAPE WAKE-UP command with the MTW Function field set to anything other than 010b (Set Up) and the EXB-8500 is not in mid-tape wake-up mode.
2Ch	00h	53h	You have issued a MID-TAPE WAKE-UP command with the MTW Function field set to 010b (Set Up) and the EXB-8500 is already in mid-tape wake-up mode.
2Ch	00h	54h	You have issued a MID-TAPE WAKE-UP command with the MTW Function field set to 001b (Wake Up) and you have not put the EXB-8500 to sleep.
2Ch	00h	55h	You have just powered on the EXB-8500 and you issue a MID-TAPE WAKE-UP command with the MTW Function field set to 000b (Sleep). After you power on the EXB-8500 in mid-tape wake-up mode, you must first issue a MID-TAPE WAKE-UP command with the MTW Function field set to 001b (Wake Up). This allows the EXB-8500 to properly position the tape for subsequent operations.

Hardware Errors

If an unrecoverable hardware error occurs during a mid-tape wake-up operation, the EXB-8500 terminates the MID-TAPE WAKE-UP command and returns Check Condition status. The sense key indicates a Hardware Error (4h). As shown in Table 3, indicators in the extended sense data can be used to isolate the error.

Table 3 Extended sense data for mid-tape wake-up Hardware Error conditions

ASC	ASCQ	FSC	Description of error
00h	00h	56h	Warning: The EEPROM is nearing the end of its expected lifetime. This error occurs when you have saved the tape's logical position approximately one million times. The reliability of the EEPROM cannot be guaranteed past one million save operations.
44h	00h	57h	Error: An attempt to program the EEPROM has failed.
44h	00h	59h	A servo hardware error was encountered.