

Digital Surveillance Recorder

Protocol Manual

HSR-1/1P

Purpose of This Manual

This manual describes the procedure for controlling the HSR-1/1P Digital Surveillance Recorder using the RS-232C from an external computer, etc. The RS-232C is the EIA standard for the interface of the communication via a modem between data terminal equipment. In this interface, data are transferred serially bit by bit. Since the RS-232C interface is employed in most computers as a standard interface, it can be used in a wide range of applications.

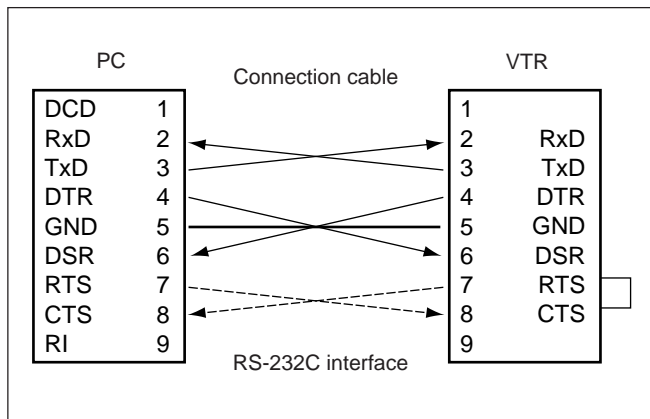
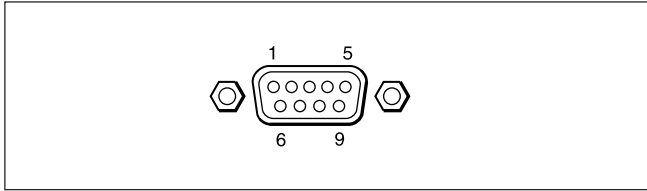
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Overview

Signal Connections

The signals used in the HSR-1/1P are shown below.



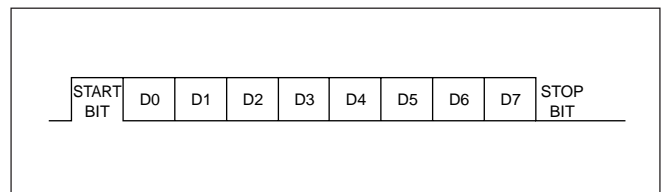
Use a cross-wire (flipped) cable to connect a computer to the HSR-1/1P. The RTS and CTS are not controlled and are shorted in a VTR. Therefore, either set the computer so as not to control the RTS/CTS signals or connect wires between the pin 7 and pin 8 as shown by the broken lines in the figure above.

Data Format

The data format is preset as shown below. Only the baud rate can be changed.

Mode: Asynchronous
 Data Length: 8 bits
 Parity: None
 Stop Bit: 1 bit
 Baud Rate: 1200/2400/4800/9600/19200/38400 bps

Bit Structure



Note

This interface may not operate at 19200 or 38400 bps, depending upon the specifications of the computer and characteristics of the cable. Select a lower baud rate.

Command Table

	0	1	2	3	4	5	6	7	8	9.1	9.3	A	B	C	C.3	D	E	F
0				0	ENTER						SCREEN DEVIDE				STATUS SENSE			
1	COMPLE- TION			1	C.E.						SCREEN AUTO CHANGE	+						
2	ERROR			2				VERSION INQ			CAMERA SELECT	-			CAMERA SENSE	HEAD HOURS		
3	CASSETTE OUT			3							T/D PRESET				T/D SENSE	OPERA- TION HOURS		
4				4					LOCK ON	ALARM SET					ALARM SENSE			
5	NOT TARGET			5					LOCK OFF	RESERVED			FWD SHUTTLE		FRAME SENSE			
6	ALARM IN			6		C.L.					T/D SEARCH		REV SHUTTLE					
7				7							ALARM SEARCH				ALARM LIST SENSE			
8				8							REC MODE				REC MODE SENSE	EXP-1		
9				9							REC PRESET				REC PRESET SENSE			
A	ACK		EJECT	PLAY /A							ALARM PRESET			REC	ALARM PRESET SENSE	EXP-3		REC REQUEST
B	NAK		FWD STEP AND STILL	B							TIMER PRESET	F.FWD			TIMER PRESET SENSE			VCR INQ
C			REV STEP AND STILL	C								REW						
D				D							USER DATA PRESET				USER DATA SENSE			
E				E							MENU PRESET				MENU SENSE			
F				STOP /F					DEVICE TYPE REQUEST		RESERVED				RESERVED			

Communication Protocol

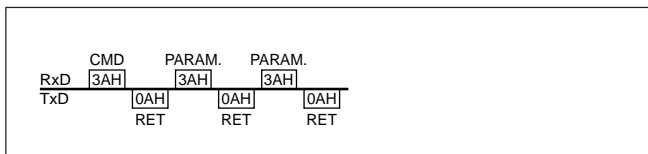
Communication is carried out in units of bytes in the following procedure. When the computer sends one byte of data, it waits for a return from the VTR before sending the next byte. The return from the VTR may not only be one byte of data, but can be multiple bytes of data. For a command, such as EJECT, which takes time to execute, not only the return immediately after receipt of the command is issued, but a return indicating the result of execution upon completion of operation is also issued. The command, the return from the VTR, and parameters are all defined as the command in the RS-232C protocol.

Commands to operate the VTR

When a command (CMD) has no parameter:



When a command (CMD) has parameters (PARAM.):



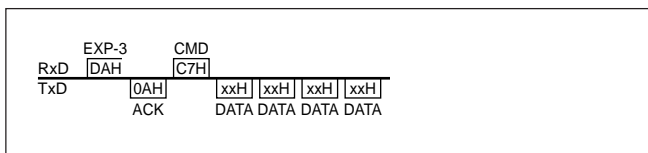
There are three kinds of returns from the VTR: ACK, NAK, and ERROR.

ACK: Returned when data is correctly returned.

NAK: Returned when communication error is detected or an unidentified command is received.

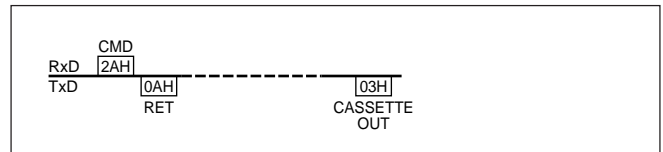
ERROR: Returned when a command cannot be executed because of tape slack and other errors.

Commands to sense VTR status



Commands from the VTR to the computer to notify of completion of an operation

This return is issued when execution of the following commands is completed: EJECT, FRAME SEARCH, T/D SEARCH, and ALARM SEARCH.



There are three kinds of return from the VTR: COMPLETION, NOT TARGET, and CASSETTE OUT.

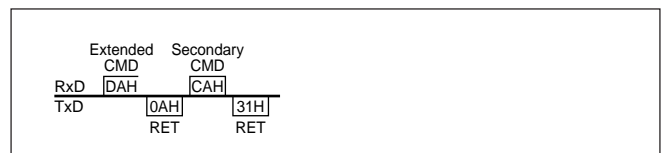
COMPLETION: Returned when command execution is correctly completed.

NOT TARGET: Returned when the target point specified by the command cannot be found.

CASSETTE OUT: Returned when the cassette is ejected.

Extended commands

A command consists basically of one byte. Some commands may function when combined with another command.



Notes

- Do not send the next command before receiving the return from the VTR. If the return from the VTR is not received within 10 msec or more after the transmission is completed, appropriate processing must be executed because the communication is judged not executed correctly.
- Do not send any other command between the extended command and the secondary command.

Detailed Descriptions of Commands

VTR Return Commands

When the VTR receives a command from the computer, it returns a VTR return command. The HSR-1/1P supports the following commands.

ACK (0AH)

ACK is returned when the VTR receives the defined command correctly. When the command from computer requests STATUS SENSE or other data, ACK is not returned, but only data is returned.

NAK (0BH)

NAK is returned if a command which is not defined for the current mode (for example, a numerical value command in a mode other than the numerical input mode) is received, or when a communication error is detected.

COMPLETION (01H)

COMPLETION is returned when the VTR has completed the operation of the T/D SEARCH or ALARM SEARCH command. The COMPLETION command will not be returned if the VTR receives a tape-run-related command or the C.L. command before completion of the above commands, because the VTR stops executing the above commands to execute a new command.

ERROR (02H)

Notifies of generation of an error during operation. ERROR is returned when a VTR receives a command that cannot be executed because of an error, such as tape slack, etc., or when an error has occurred during execution of the T/D SEARCH or ALARM SEARCH command, and stopped the operation. Remove the cause of the error and release the error status using the C.E. and C.L. commands.

NOT TARGET (05H)

Notifies that the VTR could not find the specified position on the tape when executing the T/D SEARCH or ALARM SEARCH command.

CASSETTE OUT (03H)

Notifies that the cassette was ejected.

ALARM IN (06H)

Notifies of alarm input. Each time an alarm is generated, this command is issued. Which channel is in alarm status can be confirmed by using the ALARM SENSE (DAH+C4H) command.

Numerical Value Commands

The numerical value commands are used to specify numerical parameters. These commands are also used when returning numerical data, such as time data, from the VTR to the computer. The following four command formats are supported:

Numerical value commands 0 to 9 (30H to 39H)

To express numerical values 0 to 9 for each command.

Numerical value commands A to F (3AH to 3FH)

To express numerical values A to F for each command.

Sign (+) command (A1H) and sign (-) command (A2H)

Used to specify the sign of numerical data.

ENTER (40H)

Used to specify completion of numerical parameter input.

Detailed Descriptions of Commands

General Purpose Control Commands

C.E. (41H)

This clears the error status or the last character of numerical data entered. A sign entered cannot be cleared with this command. To clear a sign, enter the new sign.

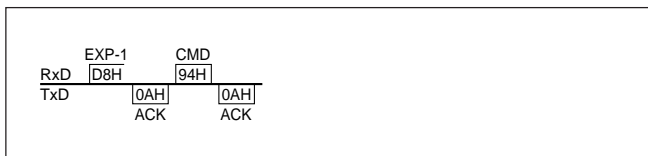
C.L. (56H)

This releases the error status and clears the present command. If the C.L. command is sent after issuing a command with numerical parameter but before confirming the numerical parameter, the numerical parameter input is stopped, and the command with numerical value parameter is cleared.

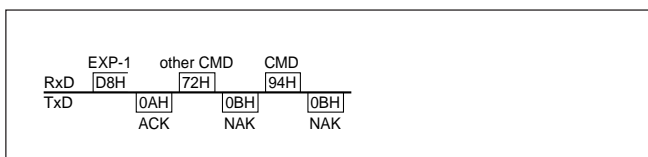
EXP-1 (D8H), EXP-3 (DAH)

EXP-1 and EXP-3 are the first and third extended commands. These commands become valid after they are combined with a secondary command. If any other command is issued between this command and the secondary command, the extended command is canceled, and NAK is returned.

Example: When the LOCK ON command is correctly executed.



Example: This is a case in which the LOCK ON command could not be correctly executed because a command other than a secondary command was issued after the extended command:



Mode Control Commands

REC REQUEST (FAH)

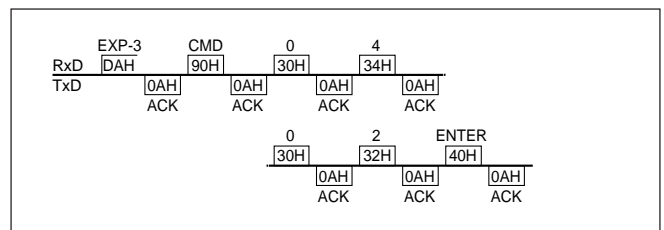
This command must be issued immediately before sending the REC command.

SCREEN DIVIDE (DAH+90H)

Selects the display structure.

Two bytes for the number of divisions, another 2 bytes for the page number, and the ENTER command (40H) must follow.

Example: To select the second page of 4-division mode:



SCREEN AUTO CHANGE (DAH+91H)

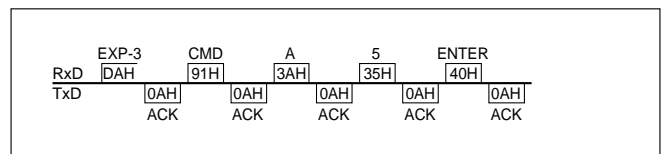
Automatically switches the display.

Parameter bytes to specify the output port (A or B) and the cycle in seconds and the ENTER command (40H) must follow.

If 00 is specified for the cycle, no automatic switching is executed.

If the output port is not specified, output port A is selected.

Example: To switch the display for output port A every 5 seconds:

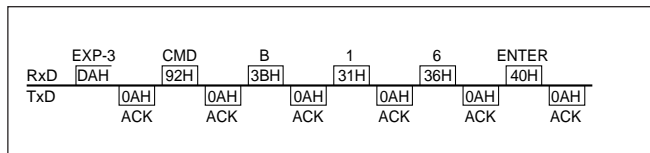


CAMERA SELECT (DAH+92H)

Directly selects the camera to be monitored. Parameter bytes to specify the output port (A or B) and the camera number and the ENTER command (40H) must follow.

By setting the camera number to A (3AH) for output port B, the same signal as that from port A can be output from both ports.

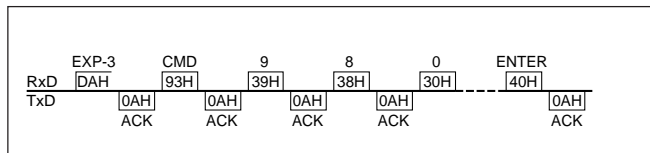
Example: To select camera 16 for output port B:



T/D PRESET (DAH+93H)

Sets the built-in clock. Parameter bytes to specify the year, month, day, hour (24H mode), minute and second in this sequence and the ENTER command (40H) must follow.

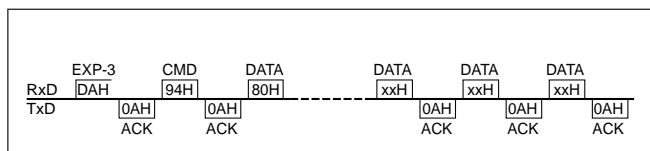
Example: To set January 1, 1998, 3:10, and 58 seconds p.m.:



ALARM SET (DAH+94H)

Sets the VTR to Alarm mode. Parameter bytes to control the alarm may follow. The parameters are of the same format as those of the return data for ALARM SENSE.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	0	ALL CAMERAS	
byte 2	CAMERA4		CAMERA3		CAMERA2		CAMERA1	
byte 3	CAMERA8		CAMERA7		CAMERA6		CAMERA5	
byte 4	CAMERA12		CAMERA11		CAMERA10		CAMERA9	
byte 5	CAMERA16		CAMERA15		CAMERA14		CAMERA13	



First byte

Bits 1 and 0: Specify the alarm input common to all cameras.

- 00: Cancel alarm input
- 01: Specify the alarm input
- 11: No change

Second to fifth bytes

Each two bits specifies the alarm input of the corresponding camera.

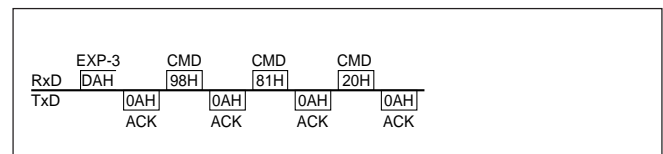
- 00: Cancel alarm input
- 01: Specify the alarm input
- 11: No change

REC MODE (DAH+98H)

Specifies the Recording mode.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	NORMAL REC MODE		
byte 2	0	TIMER REC	REPEAT REC	CONTINUOUS REC	0	ALARM REC	0	0

Example: To specify Recording mode 1 for normal recording and activate Repeat recording:



First byte

Bits 2 to 0: Specify the recording mode for normal recording.

Second byte

Bit 6: Activates/deactivates Timer recording.

- 0: Inactive
- 1: Active

Bit 5: Activates/deactivates Repeat recording.

- 0: Inactive
- 1: Active

Bit 4: Activates/deactivates Continuous recording.

- 0: Inactive
- 1: Active

Bit 2: Activates/deactivates Alarm recording.

- 0: Inactive
- 1: Active

Detailed Descriptions of Commands

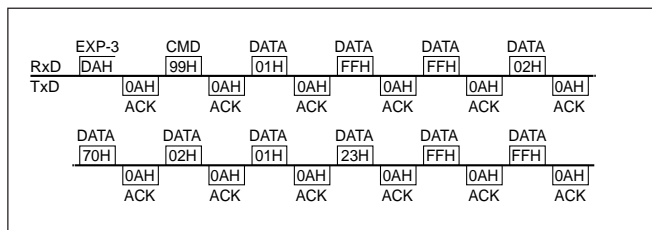
REC PRESET (DAH+99H)

Sets the requirements for the Recording modes. Parameter bytes to follow to specify the requirements are the same format of those of the return data for REC PRESET SENSE (DAH+C9H).

The time mode and recording cycle cannot be set in combination. If both are specified, the time mode setting has priority, and the recording cycle setting is ignored.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	REC MODE		
byte 2	CAMERA8	CAMERA7	CAMERA6	CAMERA5	CAMERA4	CAMERA3	CAMERA2	CAMERA1
byte 3	CAMERA 16	CAMERA 15	CAMERA 14	CAMERA 13	CAMERA 12	CAMERA 11	CAMERA 10	CAMERA9
byte 4	Thousands of TAPE LENGTH				Hundreds of TAPE LENGTH			
byte 5	Tens of TAPE LENGTH				Units of TAPE LENGTH			
byte 6	0	0	0	0	0	QUALITY MODE		
byte 7	Thousands of TIME MODE				Hundreds of TIME MODE			
byte 8	Tens of TIME MODE				Units of TIME MODE			
byte 9	Tens of REC CYCLE				Units of REC CYCLE			
byte 10	Down to the 1st decimal place of REC CYCLE				Down to the 2nd decimal place of REC CYCLE			

Example: To set the number of cameras to 16, the tape length to 270 minutes, the image quality mode to HIGH and the time mode to 123 hours for Recording mode 1:



First byte

Bits 2 to 0: Specify the Recording mode number.

Second and third bytes

Specify the tape length in units of minutes in BCD.

Fourth and fifth bytes

Each bit specifies whether to record the corresponding camera input.

- 0: Not to record
- 1: Record

Sixth byte

Specifies the image quality mode.

- 001: SUPER
- 010: HIGH
- 011: MID
- 100: LOW
- 111: No change

Seventh and eighth bytes

Specify the time mode in units of hours in BCD. When the time mode is not to be specified, pad both bytes with FFH.

Ninth and tenth bytes

Specify the recording cycle in units of 0.01 second by a BCD code.

When the cycle is not to be specified, pad both bytes with FFH.

ALARM PRESET (0AH+9AH)

Specifies the requirements for alarm recording. The parameters to be set depend on the mode of alarm recording.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	ALARM MODE		
byte 2	0	0	0	0	0	REC MODE (After Alarm)		
byte 3	TAPE END	ALARM OFF	0	TIME	Hundreds of ALARM OFF TIME			
byte 4	Tens of ALARM OFF TIME				Units of ALARM OFF TIME			
byte 5	0	0	0	0	Hundreds of PREALARM TIME			
byte 6	Tens of PREALARM TIME				Units of PREALARM TIME			

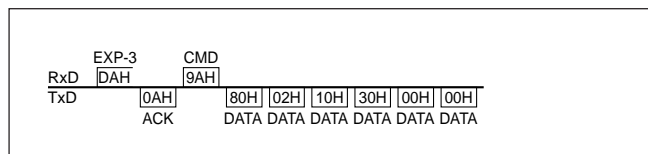
Normal mode: The pre-alarm time setting (bytes 5 and 6) is ignored.

Interleave mode: The pre-alarm time setting (bytes 5 and 6) is ignored.

Event mode: The pre-alarm time setting (bytes 5 and 6) is ignored.

Frame mode: The settings of the condition for canceling the alarm recording (bytes 2 and 3) and the pre-alarm time (bytes 5 and 6) are ignored.

Example: To switch to Recording mode 2 upon an alarm input and return to normal recording in 30 seconds:



First byte

Bits 2 to 0: Specify the mode for alarm recording.

- 000: Normal mode.
- 001: Interleave mode
- 010: Event mode
- 011: Pre-alarm mode
- 100: Frame mode

Second byte

Bits 2 to 0: Specify the recording mode after alarm input.

- 000: No recording
- 001: Recording mode 1
- 010: Recording mode 2
- 011: Recording mode 3
- 100: Recording mode 4
- 101: Recording mode 5

Third byte

Specify the condition for canceling the alarm recording started by the alarm input.

- Bit 7:** Set to 1 to cancel alarm recording when it reaches the end of the tape.
- Bit 6:** Set to 1 to cancel alarm recording when the alarm input stops.
- Bit 4:** Set to 1 to cancel alarm recording when the time specified by the third and fourth bytes has elapsed.

Third and fourth bytes

Specify the time in units of seconds until canceling alarm recording in BCD.

This time setting is valid only when bit 4 of the third byte is set to 1.

Fifth and sixth bytes

Specify the time in units of seconds to record before alarm input in pre-alarm recording mode in BCD.

This setting is valid only for pre-alarm mode.

TIMER PRESET (DAH+9BH)

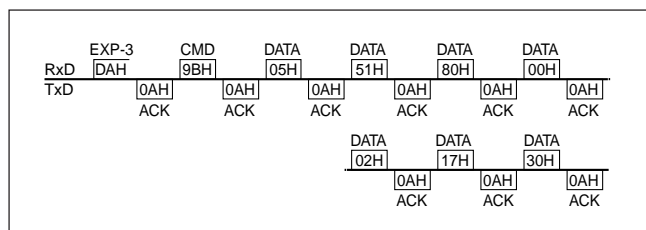
Specifies the requirements of timer recording.

Parameter bytes to follow to specify the timer number code and the items are shown below

To change the requirements for each day of the week, issue this command repeatedly for each of the days.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	TIMER PRESET NUMBER		
byte 2	WEEK				0	REC MODE (TIME 1)		
byte 3	Tens of HOURS (TIME 1)				Units of HOURS (TIME 1)			
byte 4	Tens of MINUTES (TIME 1)				Units of MINUTES (TIME 1)			
byte 5	0	0	0	0	0	REC MODE (TIME 2)		
byte 6	Tens of HOURS (TIME 2)				Units of HOURS (TIME 2)			
byte 7	Tens of MINUTES (TIME 2)				Units of MINUTES (TIME 2)			

Example: To set Recording mode 1 for 8:00 a.m. and Recording mode 2 for 5:30 p.m. on Friday for Timer 5:



First byte

Bits 2 to 0: Specify the timer number.

- 001: Timer 1
- 010: Timer 2
- 011: Timer 3
- 100: Timer 4
- 101: Timer 5
- 110: Timer 6
- 111: Timer 7

Second byte

Bits 2 to 0: Specify the Recording mode number for Time 1.

Bits 7 to 4: Specify the day of the week.

- 0000: No setting
- 0001: Monday
- 0010: Tuesday
- 0011: Wednesday
- 0100: Thursday
- 0101: Friday
- 0110: Saturday
- 0111: Sunday
- 1001: Monday to Friday
- 1111: Everyday

Third and fourth bytes

Specify the time for Time 1 in 24H mode in BCD. To cancel the time, pad both bytes with FFH.

Fifth byte

Bits 2 to 0: Specify the Recording mode number for Time 2.

Seventh and eighth bytes

Specify the time for Time 2 in 24H mode in BCD. To cancel the time, pad both bytes with FFH.

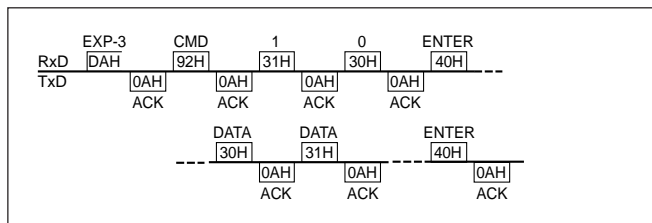
Detailed Descriptions of Commands

USER DATA PRESET (DAH+9EH)

Sets user data to be added to each picture frame to be recorded. A maximum of 32 bytes (NTSC model) or 40 bytes (PAL model) can be recorded/reproduced. If data of less than 32 or 40 bytes are specified, the remaining bytes are padded with 0s. If data of more than 32 or 40 bytes are specified, the extra bytes are ignored. Use the numerical value commands (30H to 3FH) for data.

The user data are valid for pictures to be recorded (captured) after you set the data.

Example: To set user data 01H and so on for camera 10:



MENU PRESET (DAH+9EH)

Specifies the setup menus.

The operation is determined by the subcommand (first byte) value.

Subcommand (first byte)

00H: Sets data for the specified ITEM number.

10H: Reads the data of all the ITEM numbers from nonvolatile memory

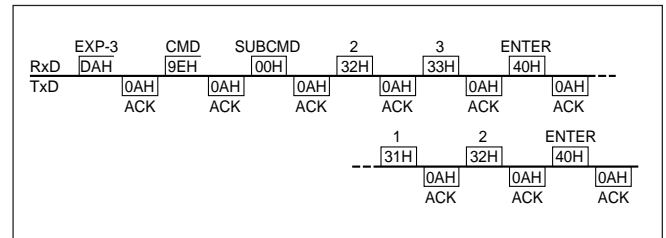
20H: Returns the data of all the ITEM numbers to the factory default settings.

21H: Returns all the data except those related to the parallel I/O to the factory default settings.

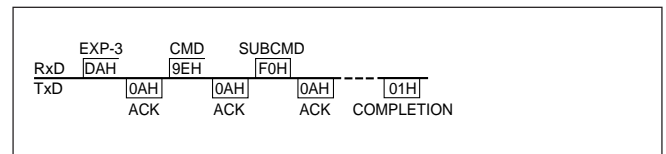
F0H: Stores the current settings to nonvolatile memory.

For the ITEM numbers and data values, see "Menu ITEM Numbers and Set Values" on page 18.

Example 1: To change the ITEM number 23 data setting to 12:



Example 2: To write the data to nonvolatile memory:



Notes

- When the subcommand is 10H, 20H, 21H, or F0H, COMPLETION (01H) will be returned after the respective operation is completed. Menu operation is disabled during this process.
- To maintain any change in data, be sure to store the data in nonvolatile memory (the subcommand F0H). If the data are not written to nonvolatile memory, the previous settings will be resumed when you next turn on the power.
- When the menu version changes, some ITEM numbers may be added or deleted. Similarly, data of an ITEM number may be added, while the meaning of data items of the same number does not change.
- When a menu is being operated on the HSR-1/1P, menu operation via the RS-232C is disabled.

LOCK ON (D8H+94H)

Disables all function keys of the VTR.

LOCK OFF (D8H+95H)

Enables all function keys of VTR.

Status Request Commands

DEVICE TYPE REQUEST (8FH)

Requests the information on the type of equipment controlled. The device type is a unique code assigned to each model to distinguish it from other models. The device type of the HSR-1/IP is A0H.

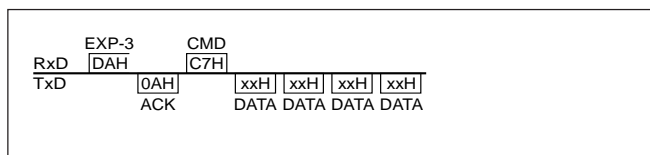
Example: With HSR-1/IP:



STATUS SENSE (DAH+C0H)

Requests the return of VTR status data. When this command is issued, the VTR returns four-byte status data, as shown below.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	REC INHIBIT	CASSETTE OUT	ALARM	0	ERROR
byte 2	PAUSE	0	SEARCH	PLAY	REW	F.FWD	STOP	EJECT
byte 3	0	TIMER REC	REPEAT REC	CONTINUOUS REC	ALARM REC			REC
byte 4	FWD/REV	0	0	0	0	ALARM SEARCH	T/D SEARCH	RESERVED



First byte

- bit 4:** Becomes 1 when a record inhibited tape is inserted.
- bit 3:** Becomes 1 when a cassette is not loaded into the VTR.
- bit 2:** Becomes 1 when an alarm occurs is generated.
- bit 0:** Becomes 1 when an error occurs.

Second byte

- bit 7:** Becomes 1 when the VTR is in Pause mode.
- bit 5:** Becomes 1 when the VTR is in Search mode.
- bit 4:** Becomes 1 when the VTR is in Play mode.
- bit 3:** Becomes 1 when the VTR is in Rewind mode.
- bit 2:** Becomes 1 when the VTR is in Fast forward mode.
- bit 1:** Becomes 1 when the VTR is in Stop mode.
- bit 0:** Becomes 1 while the VTR is ejecting the cassette.

Third byte

bit 6:

- 0: No timer setting
- 1: Timer On

bit 5: Becomes 1 when Repeat recording is on.

bit 4: Becomes 1 when Continuous recording is on.

bits 3, 2 and 1:

- 000: No alarm recording setting
- 001: Alarm recording in Normal mode is on.
- 010: Alarm recording in Interleave mode is on.
- 011: Alarm recording in Event mode is on.
- 100: Alarm recording in Pre-alarm mode is on.
- 101: Alarm recording in Frame mode is on.

bit 0: Becomes 1 when the VTR is recording.

Fourth byte

bit 7: Shows the search direction when the VTR is in Search mode.

- 0: FWD
- 1: REV

bit 2: Becomes 1 while the VTR is executing the ALARM SEARCH (DAH+97H) command.

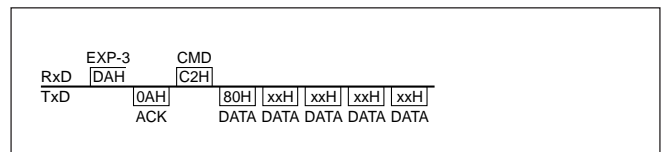
bit 1: Becomes 1 while the VTR is executing the T/D SEARCH (DAH+96H) command.

bit 0: Reserved

CAMERA SENSE (DAH+C2H)

Requests the status of camera connections and video signal inputs. When this command is issued, the VTR returns the five-byte status data shown below.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	0	0	0
byte 2	CAMERA4		CAMERA3		CAMERA2		CAMERA1	
byte 3	CAMERA8		CAMERA7		CAMERA6		CAMERA5	
byte 4	CAMERA12		CAMERA11		CAMERA10		CAMERA9	
byte 5	CAMERA16		CAMERA15		CAMERA14		CAMERA13	



Second to fifth bytes

Each two bits show the status of the corresponding camera.

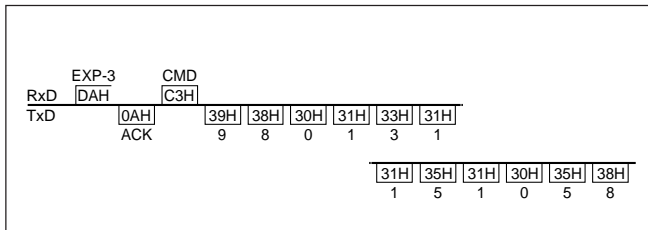
- 00: NO CONNECT
- 10: No signal input
- 11: Signal being input

Detailed Descriptions of Commands

T/D SENSE (DAH+C3H)

Requests the date/time of recording. When this command is issued, the VTR returns the date/time (year/month/day/hour/minute/second in sequence) of the current playback picture in playback mode or the current date/time in other operation modes.

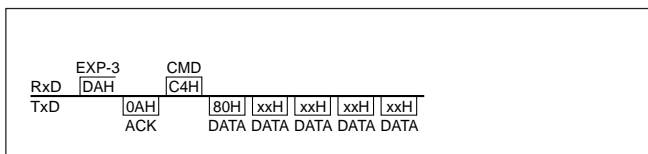
Example: In the case of Jan. 31, 1988, 3:10 and 58 seconds p.m.:



ALARM SENSE (DAH+C4H)

Requests the channel of the generated alarm. When this command is issued, the VTR returns the data shown below. Each flag is set when an alarm is generated and reset when the condition to cancel the alarm is satisfied.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	0	0	ALL CAMERAS
byte 2	CAMERA4		CAMERA3		CAMERA2		CAMERA1	
byte 3	CAMERA8		CAMERA7		CAMERA6		CAMERA5	
byte 4	CAMERA12		CAMERA11		CAMERA10		CAMERA9	
byte 5	CAMERA16		CAMERA15		CAMERA14		CAMERA13	



First byte

Bits 1 and 0: Show the status of the alarm input common to all cameras.

- 00: No alarm input
- 01: Alarm generated

Second to fifth bytes

Each two bits show the status of the alarm input of the corresponding camera.

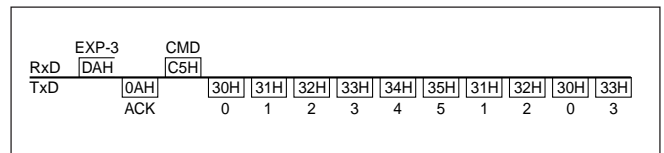
- 00: No alarm input
- 01: Alarm generated

FRAME SENSE (DAH+C5H)

Requests the position on the tape of the current playback picture. When this command is issued, the VTR returns the time code data of the current playback picture and the subdata to indicate the area within the frame. The value of the subdata depends on the image quality mode, as shown below.

	HYPER	SUPER	HIGH	MIDDLE	LOW
Subdata value	0	0 to 1	0 to 3	0 to 7	0 to 15

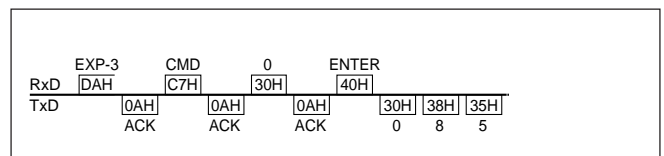
Example: If the time code is 01:23:45:12 and the subdata value is 3:



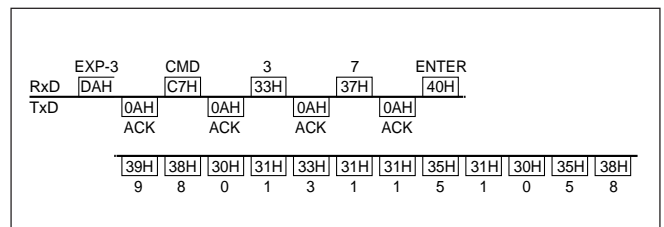
ALARM LIST SENSE (DAH+C7H)

Requests information on the alarm list. When this command is issued with the number of the desired alarm recording on the list and ENTER (40H), the VTR returns the information (year/month/day/hour/minute/second in sequence) of the specified alarm recording. When 0 is specified for the alarm recording number, the number of the alarm recordings on the list is returned by three bytes.

Example: When 85 alarm recordings are on the list:



Example: When alarm recording 37 was recorded on Jan. 31, 1998, 3:10 and 58 seconds, p.m.:

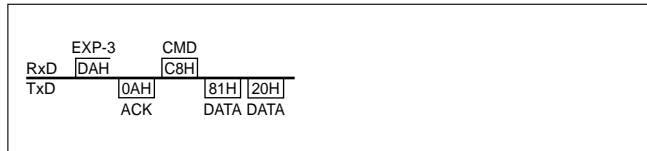


REC MODE SENSE (DAH+C8H)

Requests the specified recording mode.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	NORMAL REC MODE		
byte 2	0	TIMER REC	REPEAT REC	CONTINUOUS REC	0	ALARM REC	0	0

Example: When Recording mode 1 is set for normal recording and Repeat recording is active:



First byte

Bits 2 to 0: Shows the recording mode set for normal recording.

Second byte

Bit 6: Shows the status of Timer recording.

- 0: Inactive
- 1: Active

Bit 5: Shows the status of Repeat recording.

- 0: Inactive
- 1: Active

Bit 4: Shows the status of Continuous recording.

- 0: Inactive
- 1: Active

Bit 2: Shows the status of Alarm recording.

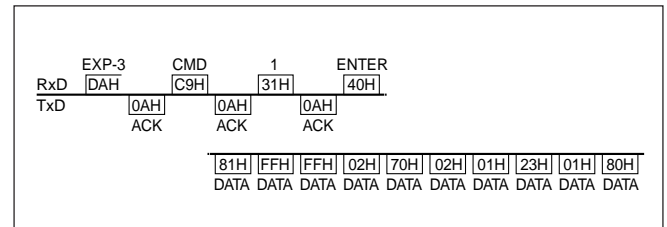
- 0: Inactive
- 1: Active

REC PRESET SENSE (DAH+C9H)

Requests the setting status of each Recording mode. When this command is issued with the number of the desired recording mode number and ENTER (40H), the VTR returns the settings of the specified Recording mode, as shown below.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	REC MODE		
byte 2	CAMERA8	CAMERA7	CAMERA6	CAMERA5	CAMERA4	CAMERA3	CAMERA2	CAMERA1
byte 3	CAMERA16	CAMERA15	CAMERA14	CAMERA13	CAMERA12	CAMERA11	CAMERA10	CAMERA9
byte 4	Thousands of TAPE LENGTH				Hundreds of TAPE LENGTH			
byte 5	Tens of TAPE LENGTH				Units of TAPE LENGTH			
byte 6	0	0	0	0	QUALITY MODE			
byte 7	Thousands of TIME MODE				Hundreds of TIME MODE			
byte 8	Tens of TIME MODE				Units of TIME MODE			
byte 9	Tens of REC CYCLE				Units of REC CYCLE			
byte 10	Down to the 1st decimal place of REC CYCLE				Down to the 2nd decimal place of REC CYCLE			

Example: In the case of Recording mode 1, 16 cameras, 270-minute tape, HIGH image quality mode, 123-hour time mode, 1.8-second cycle:



First byte

Bits 2 to 0: Show the Recording mode number.

Second and third bytes

Show the tape length in units of minutes in BCD.

Fourth and fifth bytes

Each bit shows whether to record the corresponding camera input.

- 0: Not to record
- 1: Record

Sixth byte

Shows the image quality mode.

- 001: SUPER
- 010: HIGH
- 011: MID
- 100: LOW

Seventh and eighth bytes

Show the time mode in units of hours in BCD.

When the time mode has not been specified, both bytes are padded with FFH.

Ninth and tenth bytes

Show the recording cycle in units of 0.01 second by a BCD code.

When the cycle has not been specified, both bytes are padded with FFH.

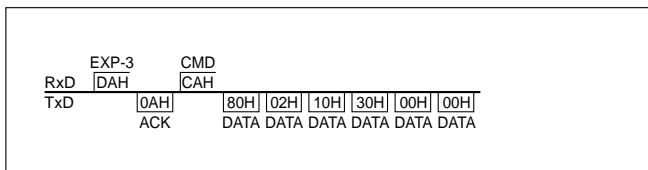
Detailed Descriptions of Commands

ALARM PRESET SENSE (DAH+CAH)

Requests the alarm recording setting status. When this command is issued, the VTR returns the alarm recording settings, as shown below.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	ALARM MODE		
byte 2	0	0	0	0	0	REC MODE (After Alarm)		
byte 3	TAPE END	ALARM OFF	0	TIME	Hundreds of ALARM OFF TIME			
byte 4	Tens of ALARM OFF TIME				Units of ALARM OFF TIME			
byte 5	0	0	0	0	Hundreds of PREALARM TIME			
byte 6	Tens of PREALARM TIME				Units of PREALARM TIME			

Example: When switching to Recording mode 2 upon alarm input and returning to normal recording in 30 seconds:



First byte

Bits 2 to 0: Show the mode of alarm recording.

- 000: Normal mode.
- 001: Interleave mode
- 010: Event mode
- 011: Pre-alarm mode
- 100: Frame mode

Second byte

Bits 2 to 0: Show the recording mode after alarm input.

- 001: Recording mode 1
- 010: Recording mode 2
- 011: Recording mode 3
- 100: Recording mode 4
- 101: Recording mode 5

Third byte

Shows the condition for canceling the alarm recording started by the alarm input.

- Bit 7:** 1 when canceling the alarm recording when it reaches the end of the tape
- Bit 6:** 1 when canceling the alarm recording when the alarm input stops
- Bit 4:** 1 when canceling the alarm recording when the time specified by the third and fourth bytes has elapsed

Third and fourth bytes

Show the time in units of seconds until canceling alarm recording in BCD.

This time setting is valid only when bit 4 of the third byte is set to 1.

Fifth and sixth bytes

Show the time in units of seconds to record before alarm input in Pre-alarm recording mode in BCD.

This setting is valid only for Pre-alarm mode.

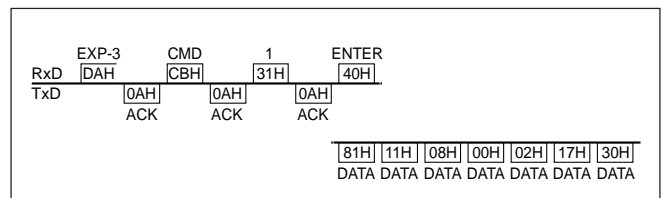
TIMER PRESET SENSE (DAH+CBH)

Requests the timer setting status. When this command is issued with the number of the desired timer number and ENTER (40H), the VTR returns the settings of the specified timer as shown below.

To check all the timer settings, repeat this command as many times as the number of timers.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	0	0	0	0	TIMER PRESET NUMBER		
byte 2	WEEK				0	REC MODE (TIME 1)		
byte 3	Tens of HOURS (TIME 1)				Units of HOURS (TIME 1)			
byte 4	Tens of MINUTES (TIME 1)				Units of MINUTES (TIME 1)			
byte 5	0	0	0	0	0	REC MODE (TIME 2)		
byte 6	Tens of HOURS (TIME 2)				Units of HOURS (TIME 2)			
byte 7	Tens of MINUTES (TIME 2)				Units of MINUTES (TIME 2)			

Example: In a case when Timer 1 has been set for Recording mode 1 at 8:00 a.m. and Recording mode 2 at 5:30 p.m. on Monday:



First byte

Bits 2 to 0: Show the timer number.

- 001: Timer 1
- 010: Timer 2
- 011: Timer 3
- 100: Timer 4
- 101: Timer 5
- 110: Timer 6
- 111: Timer 7

Second byte

Bits 2 to 0: Show the Recording mode number for Time 1.

Bits 7 to 4: Show the day of the week.

- 0000: No setting

- 0001: Monday
- 0010: Tuesday
- 0011: Wednesday
- 0100: Thursday
- 0101: Friday
- 0110: Saturday
- 0111: Sunday
- 1001: Monday to Friday
- 1111: Everyday

Third and fourth bytes

Show the time for Time 1 in 24H mode in BCD.
When no time setting has been made, both bytes are padded with FFH.

Fifth byte

Bits 2 to 0: Show the Recording mode number for Time 2.

Seventh and eighth bytes

Show the time for Time 2 in 24H mode in BCD.
When no time setting has been made, both bytes are padded with FFH.

USER DATA SENSE (DAH+CDH)

Requests the user data which are additionally recorded on each picture frame.

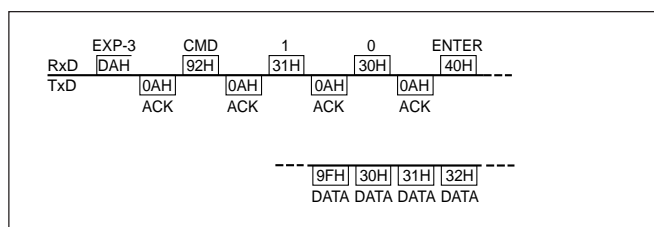
When the camera number is specified, the recorded data are returned in playback mode or the data to be recorded in other modes.

A maximum of 32 bytes (NTSC model) or 40 bytes (PAL model) can be recorded/reproduced. The data are read in the sequence of setting.

The numerical value commands (30H to 3FH) are used for data.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	BYTE COUNTS						
byte 2	0	0	1	1	DATA 1			
byte 3	0	0	1	1	DATA 2			
byte n	0	0	1	1	DATA n			

Example: When 01H and so on have been set as user data for camera 10:



MENU SENSE (DAH+CEH)

Requests the Setup menu status.

Specify the data to be sensed by the subcommand (first byte) value.

The number of data bytes is added to the top of the returned data.

	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
byte 1	1	BYTE COUNTS						
byte 2	DATA 1							
byte 3	DATA 2							
byte n	DATA n							

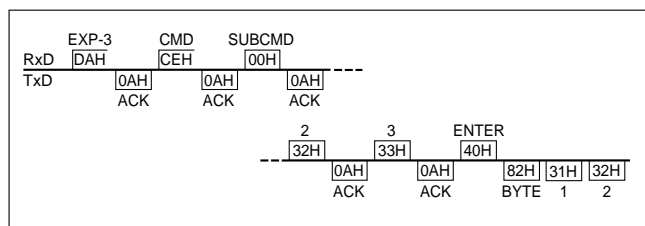
First byte (subcommand)

00H: Reads the data of the specified ITEM number.

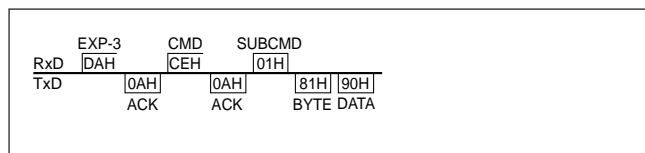
01H: Reads the version number of the menus. The structure of the return data is the same as that for ROM VERSION (72H).

FFH: Read the largest ITEM number.

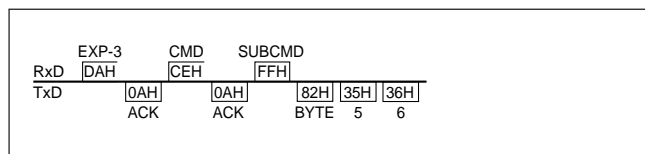
Example 1: When the setting of ITEM number 23 is 12:



Example 2: When the menu version is 1.0:



Example 3: When the largest ITEM number is 56:



Notes

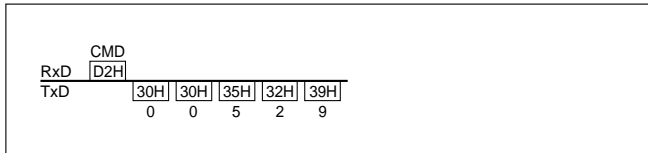
- When the menu version changes, some ITEM numbers may be added or deleted. Similarly, data of an ITEM number may be added, while the meaning of data items of the same number does not change.
- When a menu is being operated on the HSR-1/1P, menu operation via the RS-232C is disabled.

Detailed Descriptions of Commands

HEAD HOURS (D2H)

Requests the accumulated time of use of the heads. When this command is issued, the VTR returns 5 bytes of data to indicate the time

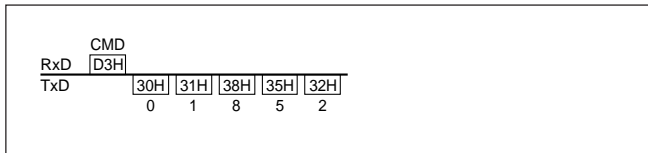
Example: When the time is 529 hours:



OPERATION HOURS (D3H)

Requests the accumulated powered time of the VTR. When this command is issued, the VTR returns 5 bytes of data to indicate the time

Example: When the time is 1852 hours:



ROM VERSION INQ (72H)

Requests the ROM version of the VTR. When this command is issued, a one-byte code is returned, as shown below.

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
1	Version number numerals above the decimal point.			Version number numerals below the decimal point.			

Example: When the version number is 1.5:



VCR INQ (FBH)

Checks whether the connected equipment is a VTR or not. When the connected equipment is a VTR, ACK is returned. If not, NAK is returned.

Tape Run System Commands

PLAY (3AH)

This command sets the VTR to PLAY mode.

F.FWD (ABH)

This command sets the VTR to Fast Forward mode.

REW (ACH)

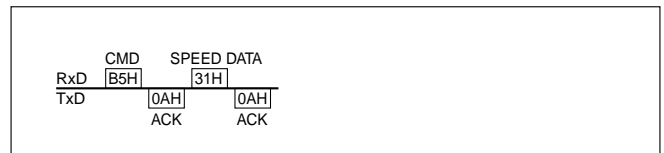
This command sets the VTR to Rewind mode.

FORWARD SHUTTLE (B5H)

This command sets the VTR to Playback mode at the specified speed in the forward direction.

Parameter	Speed
30H	STILL
31H	Fwd x1/30
32H	Fwd x1/10
33H	Fwd x1/5
34H	Fwd x1/2
35H	Fwd x1
36H	Fwd x2
37H	Fwd x5
38H	Fwd x16

Example: To play back at 1/30 speed in the forward direction:

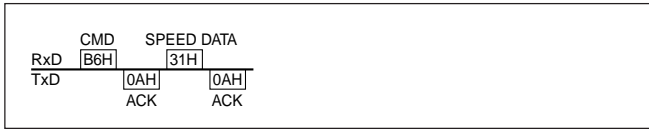


REVERSE SHUTTLE (B6H)

This command sets the VTR to Playback mode at the specified speed in the reverse direction.

Parameter	Speed
30H	STILL
31H	Rev x1/30
32H	Rev x1/10
33H	Rev x1/5
34H	Rev x1/2
35H	Rev x1
36H	Rev x2
37H	Rev x5
38H	Rev x16

Example: To play back at 1/30 speed in the reverse direction:



STOP (3FH)

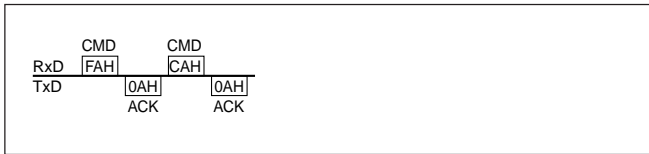
This command sets the VTR into STOP Mode.

EJECT (2AH)

This command ejects the cassette.

REC (CAH)

This command sets the VTR to REC Mode. The REC REQUEST command must be transmitted immediately before this command.



FORWARD STEP AND STILL (2BH)

Advances the tape by 1 frame and freezes the picture. When this command is issued, the VTR advances the tape by 1 frame and resumes or enters Still mode.

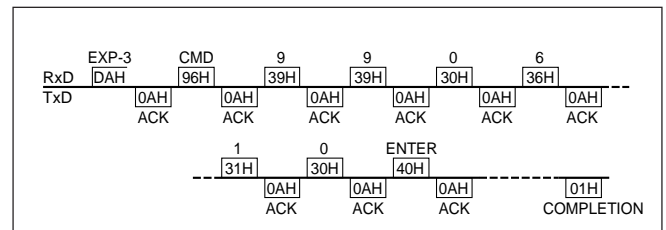
REVERSE STEP AND STILL (2CH)

Reverses the tape by 1 frame and freezes the picture. When this command is issued, the VTR reverses the tape by 1 frame and resumes or enters Still mode.

T/D SEARCH (DAH+96H)

Locates the tape position of the specified date/time. When this command is issued with the date/time (year/month/day/hour/minute/second in sequence) to be located and the ENTER command (40H), the VTR locates the specified position and returns COMPLETION (01H). If the specified position cannot be located, the VTR returns NOT TARGET (05H).

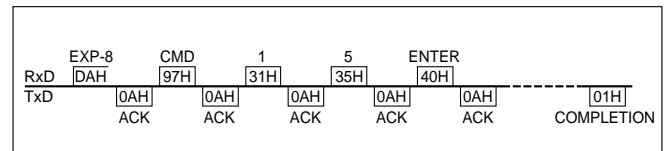
Example: To search for June 10, 1999, 5:30, and 10 seconds p.m.:



ALARM SEARCH (DAH+97H)

Locates the tape position of the specified recording in the alarm list. When this command is issued with the number of the desired alarm recording in the list and ENTER (40H), the VTR locates the position of the specified alarm recording and returns COMPLETION (01H). If the specified position cannot be located, the VTR returns NOT TARGET (05H).

Example: To search for alarm recording 15:



Detailed Descriptions of Commands

Menu ITEM Numbers and Set Values

IMAGE CONTROL MENU (ITEM No. 1 to 45)

No.	Item		Set values
1	A IMAGE	MONITOR	0: MANUAL 1: AUTO
2		ALARM CHANGE	0: OFF 1: ON
3		AUTO CYCLE	1 to 60
4	B IMAGE	IMAGE	0: A IMAGE 1: AUTO 2-17: Camera1-16
5		ALARM CHANGE	0: OFF 1: ON
6		AUTO CYCLE	1 to 60
7	CAMERA CONNECTION		Special ^{a)}
8 - 26	MONI DISP STRUCTURE		Special ^{a)}
27- 45	PLAY DISP STRUCTURE		Special ^{a)}

INDICATION CONTROL MENU (ITEM No. 46 to 78)

No.	Item		Set values
46	BORDER LINE		0: BLACK 1: WHITE 2: NO
47	DATE FORMAT		0: Y M D 1: M D Y 2: D M Y
48	MONTH FORMAT		0: NUMBER 1: ALPHABET
49	TIME FORMAT		0: 12H 1: 24H
50	FRNT TIME DISP		0: TIME MODE 1: REC TIME 2: TIME
51	MONI CHAR TYPE		0: WHITE 1: BLACK
52	MONI CHAR INFO	CAMERA NAMES	0: DISPLAY 1: NO
53		DATE	0: DISPLAY 1: NO
54		TIME	0: DISPLAY 1: NO
55		REC MODE	0: DISPLAY 1: NO
56		TIME MODE	0: DISPLAY 1: NO
57		QUALITY MODE	0: DISPLAY 1: NO
58		REC CYCLE	0: DISPLAY 1: NO

No.	Item		Set values
59	REC CHAR POSI		0: UP LEFT 1: UP RIGHT 2: LOW LEFT 3: LOW RIGHT
60	REC CHAR INFO	CAMERA NO.	0: DISPLAY 1: NO
61		DATE	0: DISPLAY 1: NO
62		TIME	0: DISPLAY 1: NO
63-78	CAMERA NAME		Special ^{a)}

REC FUNCTION MENU (ITEM No. 79 to 96)

No.	Item		Set values
79	NORMAL REC		0: REC MODE 1 1: REC MODE 2 2: REC MODE 3 3: REC MODE 4 4: REC MODE 5
80	TIMER REC	TIMER REC	0: OFF 1: ON
81-87		TIMER	Special ^{a)}
88	ALARM REC	ALARM REC	0: OFF 1: ON
89		ALARM SET	Special ^{a)}
90	REPEAT REC		0: OFF 1: ON
91	CONTINUOUS REC		0: OFF 1: ON
92-96	SETTING OF REC MODE		Special ^{a)}

FUNCTION CONTROL MENU (ITEM No. 97 to 100)

No.	Item		Set values
97	AUTO REW		0: ON 1: ON(PB) 2: OFF
98	POWER ON REC		0: OFF 1: ON
99	BEEP		0: ON 1: OFF
100	STILL		0: FRAME 1: FIELD

a) See "Settings for special items" on page 20.

REMOTE CONTROL MENU (ITEM No. 102 to 142)

No.	Item	Set value
102	RS232C	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400
103	PARALLEL INPUT	IN1(2PIN) 0: NO USE
104		IN2(3PIN) 1: STOP
105		IN3(4PIN) 2: REC
106		IN4(5PIN) 3: PLAY
107		IN5(6PIN) 4: F.FWD
108		IN6(7PIN) 5: REW
109		IN7(8PIN) 6: F.FRAME
110		IN8(9PIN) 7: R.FRAME
111		IN9(10PIN) 8: SERIES REC
112		IN10(11PIN) 9: TIME ADJUST
113		IN11(12PIN) 10: ALARM
114		IN12(13PIN) RETURN
115		IN13(21PIN) 11: ALARM (L)
116		IN14(22PIN) 12 - 27:
117	IN15(24PIN) ALARM 1(L) -	
118	IN16(24PIN) ALARM 16(L)	
119	IN17(25PIN) 28: ALARM (H)	
120	IN18(27PIN) 29 - 44:	
121	IN19(28PIN) ALARM 1(H) -	
122	IN20(21PIN) ALARM 16(H)	
123	IN21(29PIN)	
124	IN22(30PIN)	
125	IN23(31PIN)	
126	IN24(32PIN)	
127	PARALLEL OUTPUT	OUT1(15PIN) 0: NO USE 1:STOP
128		OUT2(16PIN) 2: REC 3: PLAY
129		OUT3(17PIN) 4: F.FWD 5: REW
130		OUT4(18PIN) 6: SERIES REC
131		OUT5(33PIN) 7: TIME ADJUST
132		OUT6(34PIN) 8: ALARM RETURN
133		OUT7(35PIN) 9: ALARM
134		OUT8(36PIN) 10: TAPE END 11: TAPE EXIST 12: AUTO OFF 13: VIDEO LOSS
135	PARALLEL OUT VOLTAGE	OUT1(15PIN) 0: OPEN
136		OUT2(16PIN) 1: 5 V
137		OUT3(17PIN) 2: 12 V
138		OUT4(18PIN)
139		OUT5(33PIN)
140		OUT6(34PIN)
141		OUT7(35PIN)
142		OUT8(36PIN)

MAINTENANCE MENU (ITEM No. 143 to 152)

No.	Item	Set value
143	SERVICE USE	TAPE 0: USE 1: NOT USE
144		HARD DISC 0: USE 1: NOT USE
145		SYSTEM DATA 0: USE 1: NOT USE
146		POWER BACKUP 0: ON 1: OFF
147		MUTIPLEX 0: ON 1: OFF
148		CONT REC/PLAY 0: OFF 1: ON
149		EE MODE 0: OFF 1: ON
150		DRAM DUMP 0: OFF 1: ON
151		DEBUG INFO 0: NO DISPLAY 1: DISPLAY
152		ERROR INFO 0: DISPLAY 1: NO DISPLAY

TOP MENU (ITEM No. 155 to 157)

No.	Item	Set value
155	TIME ADJUST	Special ^{a)}
156	MENU GRADE	0: BASIC 1: ENHANCED
157	LANGUAGE	0: JAPANESE 1: ENGLISH

a) See "Settings for special items" on page 20.

Detailed Descriptions of Commands

Settings for special items

No.7: CAMERA CONNECTION

Specify the settings (0: NO or 1: CONNECT) for all cameras with four bytes after the ITEM number (37H), and send ENTER (40H).

First byte (30H to 3FH):

Set camera 8 to 5 with lower 4 bits.

Second byte (30H to 3FH):

Set camera 4 to 1 with lower 4 bits.

Third byte (30H to 3FH):

Set camera 16 to 13 with lower 4 bits.

Third byte (30H to 3FH):

Set camera 12 to 9 with lower 4 bits.

No. 8 to 26 MONI DISP STRUCTURE

No. 27 to 45 PLAY DISP STRUCTURE

Specify the settings (0: NO, 1 to 16: MON, 17 to 32: PB) for all division of each page with two bytes (30H30H to 33H32H) after the respective ITEM numbers.

4 divisions (No. 8 to 11/27 to 30)

page 1		page 2		page 3		page 4	
0	1	4	5	8	9	12	13
2	3	6	7	10	11	14	15

6 divisions (No. 12 to 14/31 to 33)

page 1			page 2			page 3		
0	1	2	6	7	8	12	13	14
3	4	5	9	10	11	15	16	17

7 divisions (No. 15 to 17/34 to 36)

page 1			page 2			page 3		
0	1	2	7	8	9	14	15	16
3	4	5	10	11	12	17	18	19
2	3	4	9	10	11	16	17	18
5	6	7	12	13	14	19	20	21

8 divisions (No. 18&19/37&38)

page 1				page 2			
0	1	2	3	8	9	10	11
4	5	6	7	12	13	14	15

9 divisions (No. 20&21/39&40)

page 1			page 2		
0	1	2	9	10	11
3	4	5	12	13	14
6	7	8	15	16	17

10 divisions (No. 22&23/41&42)

page 1				page 2			
0	1	2	3	10	11	12	13
4	5	6	7	14	15	16	17
8	9	10	11	18	19	20	21
12	13	14	15	22	23	24	25

13 divisions (No. 24&25/43&44)

page 1				page 2			
0	1	2	3	13	14	15	16
4	5	6	7	17	18	19	20
8	9	10	11	21	22	23	24
12	13	14	15	25	26	27	28

16 divisions (No. 26/45)

page 1			
0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

No. 63 to 78: CAMERA NAME

Set a camera name for each of cameras 1 to 16.

0	1	2	3
4	5	6	7
8	9	10	11
12	13	14	15

Send a name of 12 characters (24 bytes) at maximum using ASCII codes and send ENTER (40H). Thirteenth and more characters are ignored.

Usable characters

The following 92 characters and space can be used.

!"#\$%&'()*+,-./0123456789:;<=>?@
 ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_>
 abcdefghijklmnopqrstuvwxyz{}

Example: To set "Camera 1" send 34H33H36H31H
 36H3DH36H35H37H32H36H31H32H30H33H
 31H40H.

No. 81 to 87: TIMER

Send the following data after the respective ITEM numbers.

First byte (30H to 39H):

Specify the day of the week (Mo, . . . Su, Mon-Fr, Everyday, No setting).

Second to fifth bytes (30H30H30H30H to 32H33H35H39H):

Specify TIME1 (00:00 to 23:59, two digits each).

Sixth byte (30H to 37H):

Specify REC1 (REC Stop, mode 1, . . . mode 5, Alarm REC, No Setting).

Seventh to tenth bytes (30H30H30H30H to 32H33H35H39H):

Specify TIME2 (00:00 to 23:59, two digits each).

Eleventh byte (30H to 37H):

Specify REC2 (REC Stop, mode 1, . . . mode 5, Alarm REC, No Setting).

No. 89: ALARM SET

Send the following data after the ITEM number (38H39H).

First byte (30H to 34H):

Specify Alarm recording mode (NORMAL, INTERLEAVE, EVENT, PREALARM, FRAME).

Second byte (30H to 34H):

Specify the recording mode (1 to 5) for Alarm recording.

Third byte (30H to 34H):

Specify the release condition (30 seconds, 1 minute, . . . Tape End).

Fourth and fifth bytes (30H30H to 31H30H):

Specify the Pre-alarm time (2 seconds, . . . 10 minutes).

No. 92 to 96: SETTING OF REC MODE

Set the cameras (0: NO REC, 1: REC) for each recording mode, 1 to 5, with 4 bytes after the ITEM number (39H32H to 39H36H), then subsequently send the following data.

First byte (30H to 3FH):

Set camera 8 to 5 with lower 4 bits.

Second byte (30H to 3FH):

Set camera 4 to 1 with lower 4 bits.

Third byte (30H to 3FH):

Set camera 16 to 13 with lower 4 bits.

Fourth byte (30H to 3FH):

Set camera 12 to 9 with lower 4 bits.

Fifth to seventh bytes (30H31H30H to 39H39H30H):

Set the tape length (10 to 990 minutes).

Eighth byte (30H, 32H, 33H, 34H):

Set the image quality mode (LOW, MID, HIGH SUPER).

Ninth to twelfth bytes (30H30H30H31H to 39H39H39H39H):

Set the time mode (None, 1 to 9999 hours).

Thirteenth to Sixteenth bytes (30H30H30H31H to 39H39H39H39H):

Set the recording cycle (None, 00.01 to 99.99 seconds).

To set the time mode or the recording cycle to None, send 3FH3FH3FH3FH.

When both the time mode and recording cycle are set, the time mode takes priority.

No. 155: TIME ADJUST

Send year, month, day, hour, and minute with 2 digits each after the ITEM number (31H35H35H).

