8-3. VTR COMMAND OF FLEXICART

8-3-1. Command Table

This block defines the command which is issued to the VTRs under control of Flexicart.
The command block format is shown below.

Command Block = CMD + VTR Select (+ DATA)

The first byte of the VTR select indicates the VTR group.

1st byte	01 (Fixed)

The second byte of the VTR select corresponds to bits.

	b7	b6	b5	b4	b3	b2	b1	b0
2nd byte	0	0	VTR 6	VTR 5	VTR 4	VTR 3	VTR 2	VTR 1

When two or more bits are set for the VTR Select, commands are output to each VTR.

Note : For macro commands, when two or more bits are set for the VTR Select, only the VTR corresponding to the LSB can use commands.

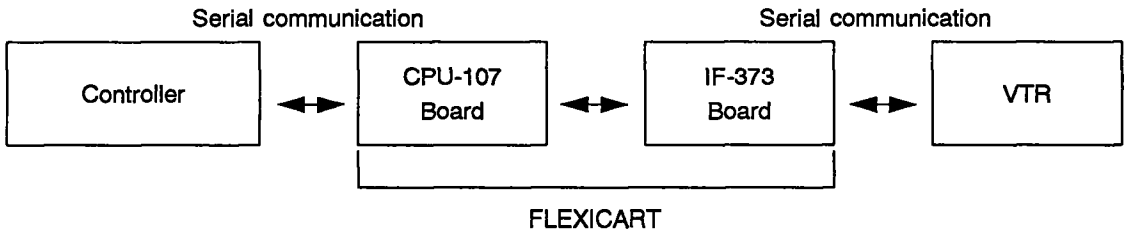
The VTR status designated by the VTR Select is returned to the Sense command according to the bit map.

CMD + V.SEL + BM + [{(VST 0)+ ···· +(VST 7)}+ ···· +{(VST 0)+ ···· +(VST 7)}]

Designates the content in { }.

Designates the VTR

For the Flexicart, the command received from the controller is sent to the VTR through three-step hardware as shown in the figure below.



Unlike the case when the VTR is controlled directly by the controller side, there exists a time delay as shown in Fig.7. When time-out occurs due to the NAK response or disconnection between the Flexicart and controlled VTR, "1" is set in the Flexicart status's "No Communication" bit. The retry to the Flexicart is done by the Flexicart. When the Flexicart does not enter the mode designated by a command within 200 msec, processing for defective operation should be performed.
When a retry occurs, the turn on time may be delayed with respect to the designated turn on time.

Command Timing

1) Command communication

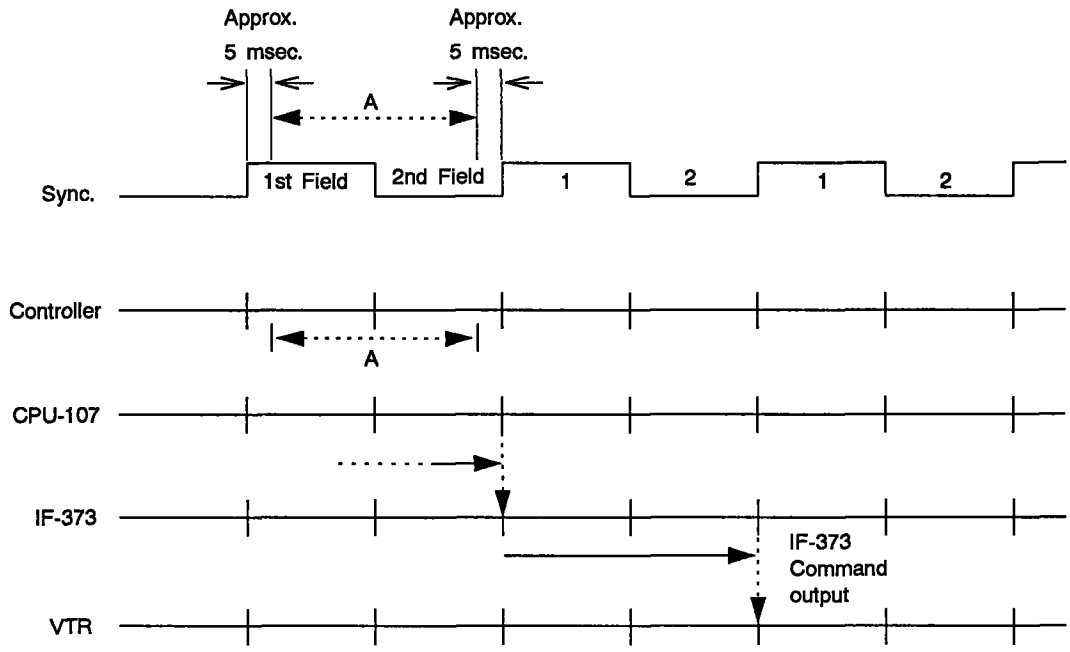


Fig-7.

※ A command is output to the VTR more than 5 msec before the leading edge of a first field, CPU-107 starts at the rise of next 1st field, and the command is output to the VTR at the leading edge of the next frames.

2) Status

When command is not issued, the Flexicart sends a Status Sense command to each VTR at the leading edge of the first field to update the internal memory.
The timecode and users bit are sensed at the leading edge of the second field, and the internal memory is then updated. When the VTR status is sensed at the controller side, the internal memory is returned.

Command List (When BT = 21H)

	Preset	Macro	Transpare		Mode Set		Sense	Return
High / Low	0	1	2	3	4	5	6	7
0		Cue-up with DATA	STOP		Stand By ON/OFF		VTR Status	←
1		Sync. Play	PLAY		Tension ON/OFF		Expanded VTR Status	←
2	Timer Mode Select	REW & EJECT	REC		Anti clog Timer ON/OFF			
3	TCG Preset	Cue-up without TC	EJECT					
4	CTL Preset		FF		Edit ON/OFF			
5	UB Preset	Normal Rec with TC	REW		Edit Preset			
6	Field Lock Select	Auto Edit	JOG (F)					
7			JOG (R)					
8			VAR (F)		Local Enable/ Disable			
9			VAR (R)					
A		Read U/B Block	SHTL (F)		TOG Run/Hold		U/B Block DATA	←
B		Write U/B Block	SHTL (R)		FREEZE ON/OFF			
C		Clear U/B Block						
D	Lost Lock Reset							
E								
F					VITC ON/OFF	VTR Throu CMD		

All commands are not always executed. (It depends on the VTRs)
For detailed information, refer to protocol manual for each VTR.

8-3-2. Command Description (When BT = 21H)

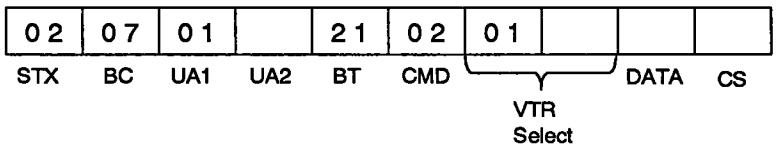
Name : Timer Mode Select

BT : 21H

Command : 02H

Function : Selects whether the timer should be set either to the Time Code mode or to the CTL mode.

Data configuration :



DATA 00 : Time Code (Default)
01 : CTL

Return :

1. ACK (04H)
2. NAK (05H)

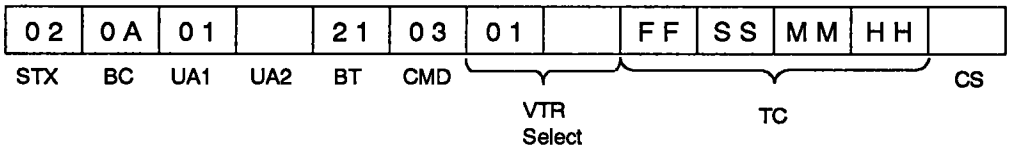
Name : Time Code Generator Preset

BT : 21H

Command : 03H

Function : Presets the VTR's timecode generator.

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

Remarks : When a Turn On command is not used, there is a delay between issuing and presetting. The timecode value directly sets the data which is sent irrespective of the system mode's preset value.

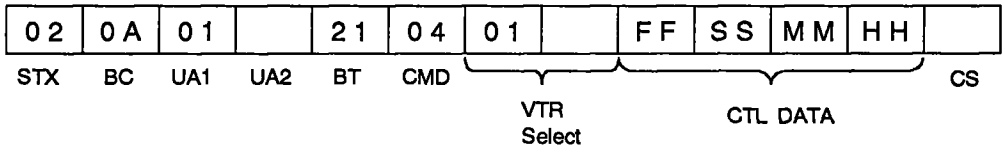
Name : CTL Preset

BT : 21H

Command : 04H

Function : Presets data to be sent to CTL counter.

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

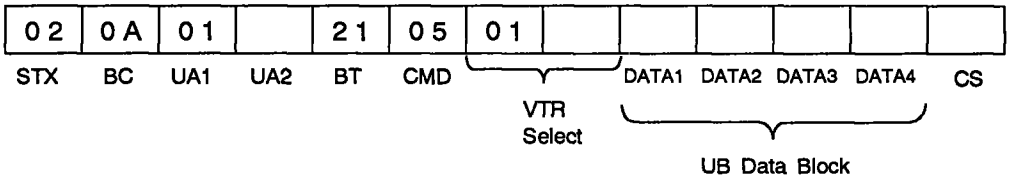
Name : UB Preset

BT : 21H

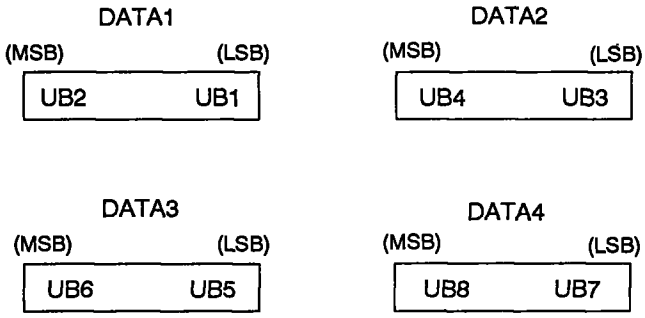
Command : 05H

Function : Presets the users bit value.

Data configuration :



UB Data Block :



Return :

1. ACK (04H)
2. NAK (05H)

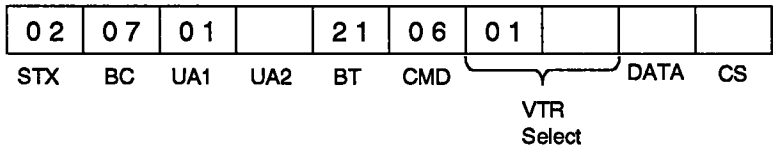
Name : Field Lock Select

BT : 21H

Commad : 06H

Function : Sets the Field Lock data

Data Configuration :



DATA 01H : 2 Fields
02H : 4 Fields
03H : 8 Fields (PAL)
FFH : Depends on the device setting

Return :

1. ACK (04H)
2. NAK (05H)

Remark : From the relation between "Field Lock Select" and the System Mode Preset commands, the data set later has the priority.

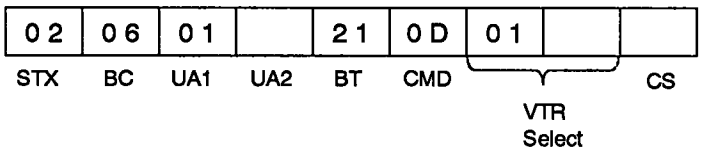
Name : Lost Lock Reset

BT : 21H

Command : 0DH

Function : Resets the VTR's status "Lost Lock Flag".

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

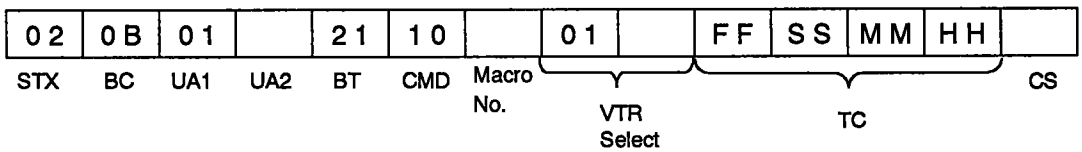
Name : Cue up with DATA

BT : 21H

Command : 10H

Function : Cues up the designated timecode position.

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

End information : Refer to the "Macro End Information" in Appendix.

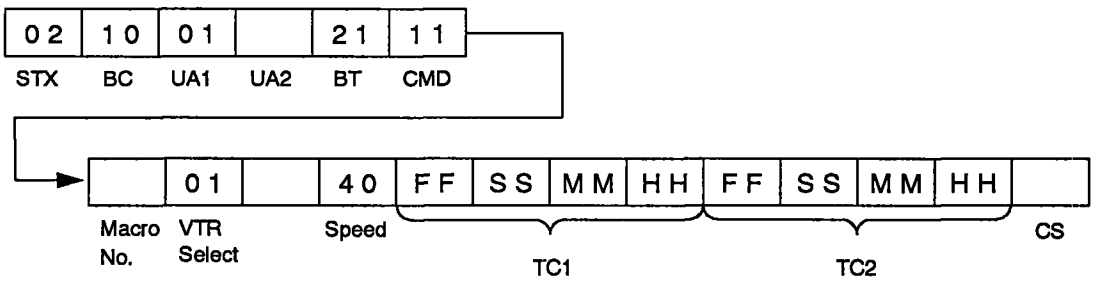
Name : Synchronize Play

BT : 21H

Command : 11H

Function : Sets the cue up time to TC1, sets the desired time of phase lock completion to TC2, and issues a command.
When the Flexicart receives the Synchronize Play command, the TC1 is set to the internal phase lock reference timer to advance the time. Phase is adjusted so that the reference timer agrees with the off-tape timecode value. When phase lock is not established between the off-tape timecode value and the reference timer's timecode value specified by TC2, the macro end information is timed out.
The controller should have finished the tape cue-up to TC1 before sending this command.

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

End information :

DATA ; Normal End
When phase lock has completed and the set is put into the NORMAL PLAY mode, the frame error information is returned.

BIT	7	6	5	4	3	2	1	0
DATA	0	0	0	0	(*1)	(*2)		

(*1) (+) ····· 0
(−) ····· 1

(*2) 0 to 7 Frame (Seven or more frames are summed into seven frames.)

For more information on end information other than the above, refer to the "Macro End Information" in Appendix.

Timing : Timing of the phase lock reference timer is same as in the Standard Time Preset timing.

Remarks :

1. When TC1 is equals to TC2, the unit goes into the NORMAL PLAY mode, omitting the phase lock sequence. In this case, the macro end status is timed out.
2. Before this command is issued, a tape should be cued up at TC1. When this command is received even if the tape is not cued up yet, Flexicart starts the phase lock sequence. If the phase lock is not completed by TC2, the VTR is put into the NORMAL PLAY mode. The macro end status is then timed out.
3. When this command is canceled before it is executed, execution is canceled. When this command is canceled after it is executed, the VTR is put into the NORMAL PLAY mode.

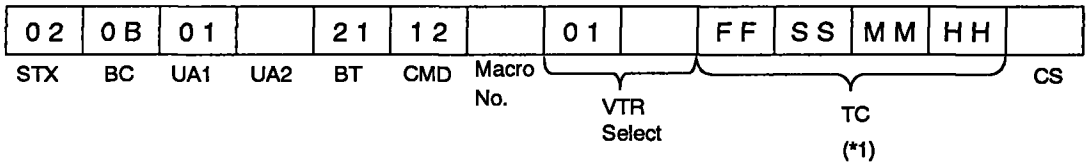
Name : REW and EJECT

BT : 21H

Command : 12H

Function : Ejects after rewound at the timecode position where is specified by TC. (Accuracy is in the unit of second)
When errors occur, cassette is ejected where error has occurred (except when a command is canceled).

Data configuration :



(*1) The option can be select when the "HH" is specified as follows :

- FFH : Ejected without rewind.
- FEH : Advanced for the amount equal to offset from tape top and ejected.
- FDH : Rewound for the amount equal to offset from tape end.
- FCH : Advanced for the amount equal to offset from the present position and ejected.
- FBH : Rewound for the amount equal to offset from the present position and ejected.

※ offset : specified by TC (frame, second, minute)

Return :

1. ACK (04H)
2. NAK (05H)

End information : Refer to the "Macro End Information" in Appendix.

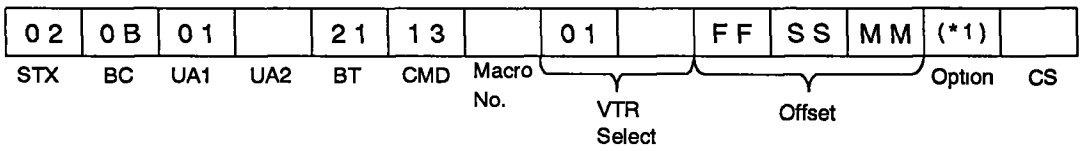
Name : Cue Up without TC

BT : 21H

Command : 13H

Function : Cues up ignoring the timecode on tape.
The cue up is executed by the internal timer, so the accuracy is not in the frame unit.
This function is selected using an optional code with the offset (minutes, seconds, frames).

Data configuration :



(*1)
- FEH : Advanced for the amount equal to offset from the present position and ejected.
- FDH : Rewound for the amount equal to offset from tape end.
- FCH : Advanced for the amount equal to offset from the present position and ejected.
- FBH : Rewound for the amount equal to offset from the present position and ejected.

Return :

1. ACK (04H)
2. NAK (05H)

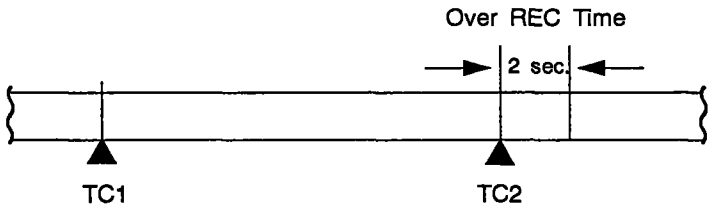
End information : Refer to the "Macro End Information" in Appendix.

Name : Normal REC with TC

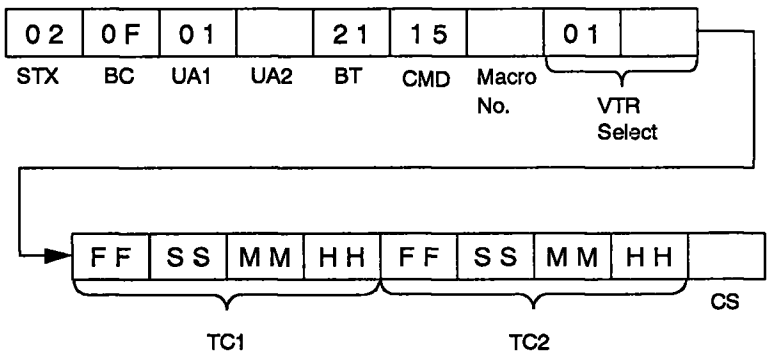
BT : 21H

Command : 15H

Function : Flexicart sets TC1 to the VTR's timecode generator and then put the VTR into normal REC mode from the present tape position. Record continues until the timecode generator reaches the "TC2 + Over REC time" (2 seconds fixed) position, and the tape is rewound to the TC2 position.



Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

End information : Refer to the "Macro End Information" in Appendix.

Name : Auto Edit

BT : 21H

Command : 16H

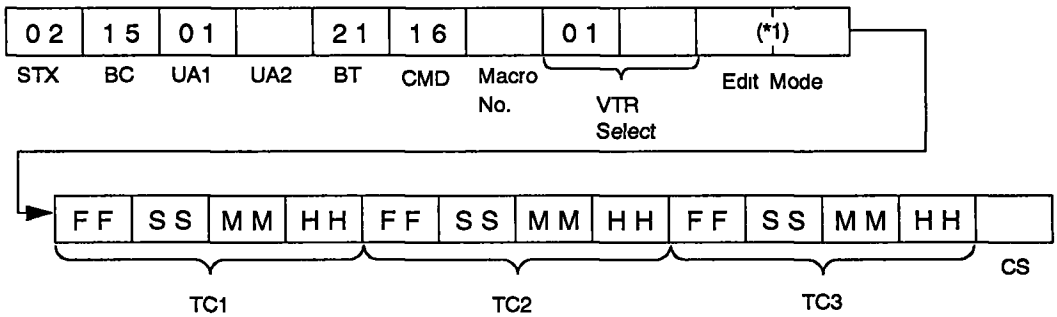
Function : After the phase lock is established between TC1 and TC2, the area between TC2 and TC3 is recorded in the edit mode.

In Assemble Mode : Record finishes at "TC3 + 2 seconds", rewound to TC3 position and stops.

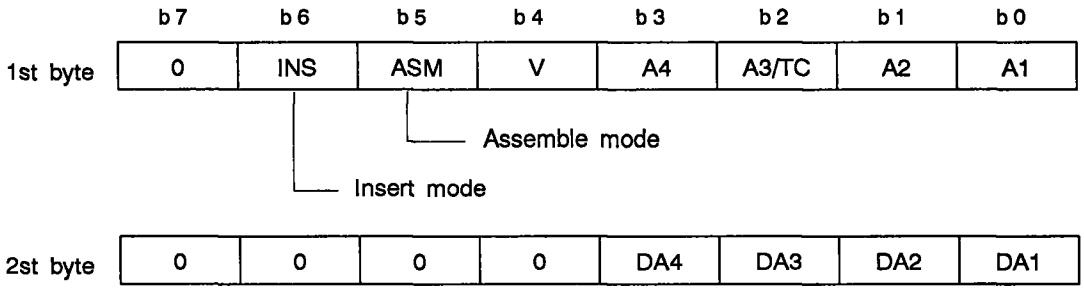
In Insert Mode : Record finishes at "TC3", then tape is played back for 2 seconds, rewound to TC3 position and stops.

When FF : XX : XX : XX is set to TC3, recording is executed in open end mode.

Data configuration :



(*1) Edit Mode : (1 : Active, 0 : Non Active)



Return :

1. ACK (04H)
2. NAK (05H)

End information : Refer to the "Macro End Information" in Appendix.

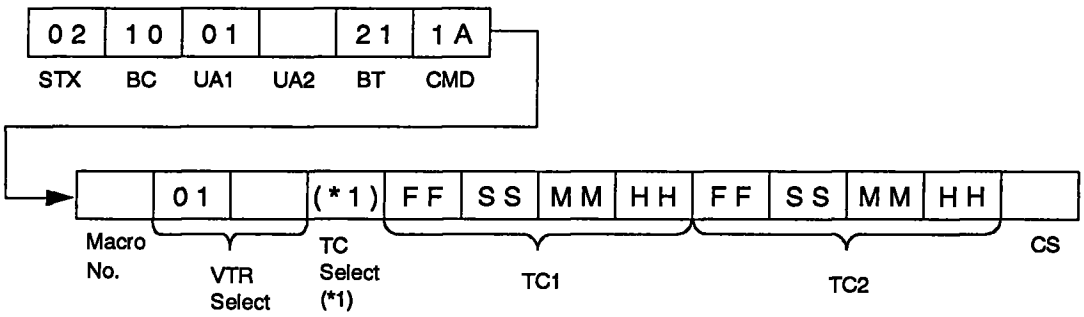
Name : Read User's BIT Block

BT : 21H

Command : 1AH

Function : Read the user bit data during the period from the off-tape position specified by TC1 to the position specified by TC2.
UB Data is stored into the memory.

Data configuration :



(*1) TC Select 01 : LTC (Fixed)

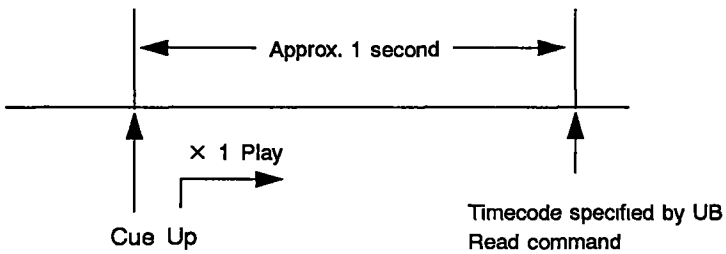
End information : Refer to the "Macro End Information" in Appendix.

Return :

1. ACK (04H)
2. NAK (05H)

Remarks :

1. When issuing this command, the controller should request the VTR to perform the following operation.



2. This command is executed only when the target VTR is in SYNC PLAY, or Normal Play mode.
3. When the target VTR enters the modes other than PLAY, this command is canceled.

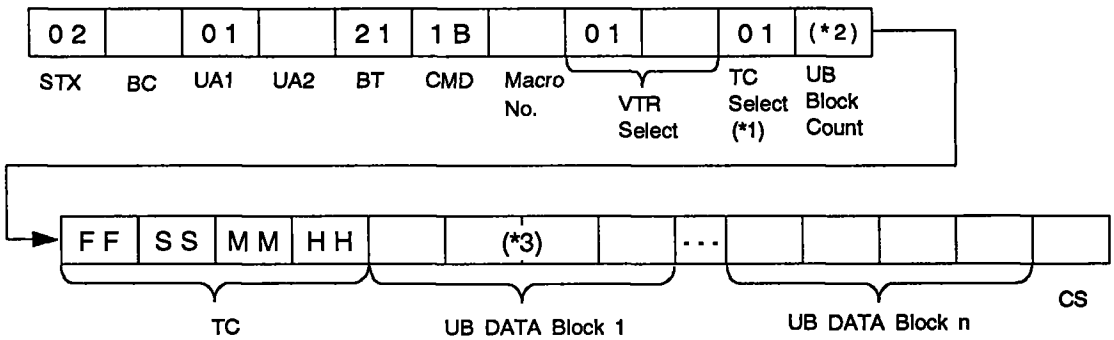
Name : Write User's BIT Block

BT : 21H

Command : 1BH

Function : Writes UB data as much as the number of user's bits block count, starting from the off-tape position specified by the timecode. When the timecode's frame digit is FFH, the VTR enters the continuous write mode, and data is then written from the frame next to the previous write end.

Data configuration :



(*1) TC Select 01 : LTC (Fixed)

(*2) BCD Code 01 ~ 60

(*3) For the UB Data Block format, refer to "UB Preset Command (05H)".

Remarks : The timecode data which is supplied, is set directly, irrespective of the system mode's preset data.

: One Block Count is 4 bytes which is the data unit to be recorded in one frame.

End information : Refer to the "Macro End Information" in Appendix.

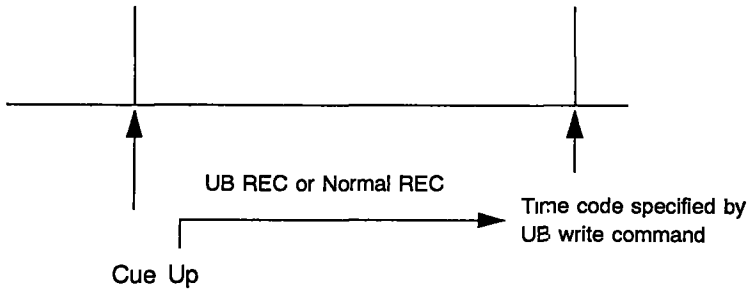
Return :

1. ACK (04H)
2. NAK (05H)

Continuous mode : When a Continuous Write mode is specified, data is written to the frame next to the previous write end.
When memory becomes insufficient, an error occurs with the end information as 1FH.

Remarks :

1. When issuing this command, the controller should request the VTR to perform the following operation.



- Edit Preset
- Edit on

2. This command is accepted in the AUTO EDIT, NORMAL REC and REC modes.

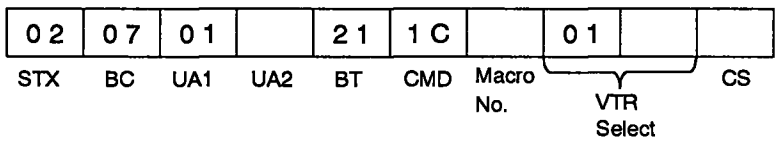
Name : Clear User's Bit Block

BT : 21H

Command : 1CH

Function : Clears the user's bit data in the Flexicart, and resets the Read Request Bit after the Sense Data processing is completed.

Data configuration :



End information : Refer to the "Macro End Information" in Appendix.

Return :

1. ACK (04H)
2. NAK (05H)

Name : STOP, PLAY, REC, EJECT, FF, REW

BT : 21H

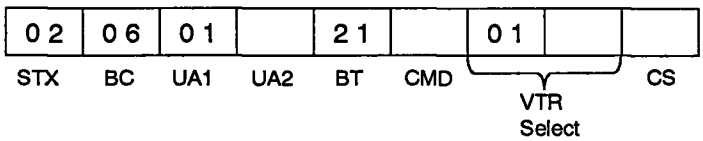
Command : 20H to 25H

Function :

20H	——	STOP
21H	——	PLAY
22H	——	REC
23H	——	EJECT
24H	——	FF
25H	——	REW

} Outputs each command to the VTR.

Data configuration :



Return :

1. ACK (04H)
2. NAK (05H)

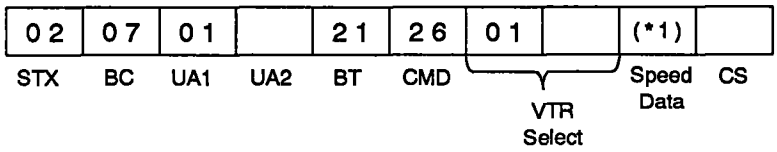
Name : JOG (F)

BT : 21H

Command : 26H

Function : Outputs JOG commands and the data to the VTR.

Data configuration :



(*1) Speed DATA ···· Speed Data is defined as follows.
Tape Speed = $10^{(N/32-1)}$
N : Speed DATA (Decimal)

Ex.

Tape Speed	Speed DATA
STILL	(0) 0H
0.1 times normal speed	(32) 20H
1.0 times normal speed	(64) 40H
About 2.9 times normal speed	(79) 4FH

Return : 1. ACK (04H)
2. NAK (05H)

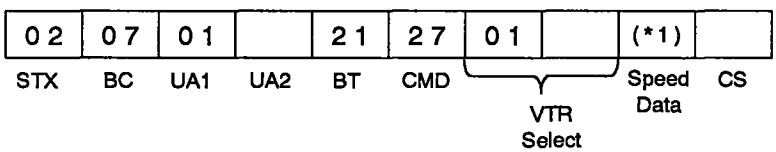
Name : JOG (R)

BT : 21H

Command : 27H

Function : Outputs JOG commands and the data to the VTR.

Data configuration :



(*1) Speed DATA ···· Refer to "JOG (F) command (26H)"

Return : 1. ACK (04H)
2. NAK (05H)

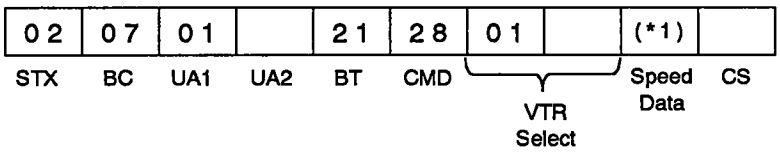
Name : VAR (F)

BT : 21H

Command : 28H

Function : Outputs VAR command and the data to the VTR.

Data configuration :



(*1) Speed DATA ···· Refer to "JOG (F) command (26H)"

Return :

1. ACK (04H)
2. NAK (05H)

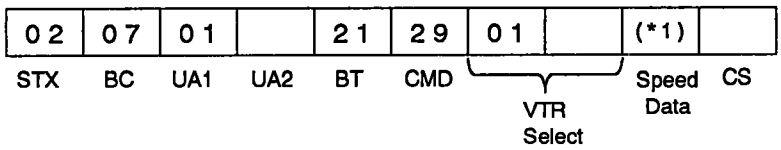
Name : VAR (R)

BT : 21H

Command : 29H

Function : Outputs VAR command and the data to the VTR.

Data configuration :



(*1) Speed DATA ···· Refer to "JOG (F) command (26H)"

Return :

1. ACK (04H)
2. NAK (05H)

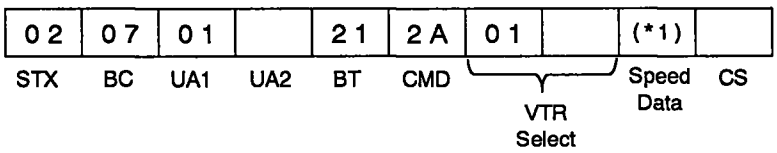
Name : SHTL (F)

BT : 21H

Command : 2AH

Function : Outputs SHUTTLE command and the data to the VTR.

Data configuration :



(*1) Speed DATA .... Refer to "JOG (F) command (26H)"

Return :

1. ACK (04H)
2. NAK (05H)

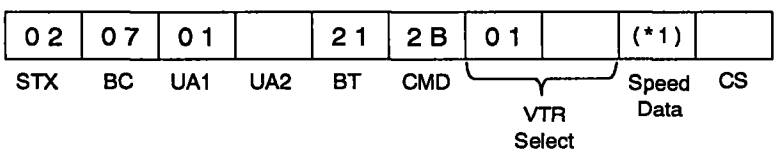
Name : SHTL (R)

BT : 21H

Command : 2BH

Function : Outputs SHUTTLE command and the data to the VTR.

Data configuration :



(*1) Speed DATA .... Refer to "JOG (F) command (26H)"

Return :

1. ACK (04H)
2. NAK (05H)

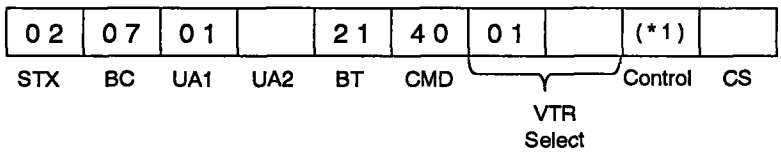
Name : Stand By ON / OFF

BT : 21H

Command : 40H

Function : Turns the VTR's Standby mode ON or OFF.

Data configuration :



(*1) Control 00 : ON
01 : OFF

Return :

1. ACK (04H)
2. NAK (05H)

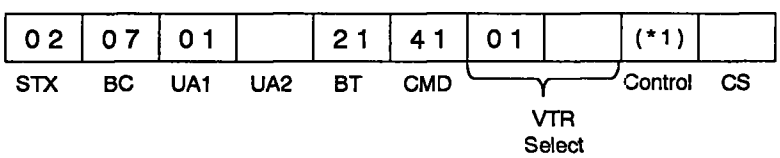
Name : Tension ON / OFF

BT : 21H

Command : 41H

Function : Turns the VTR's Tension ON or OFF.

Data configuration :



(*1) Control 00 : ON
01 : OFF

Return :

1. ACK (04H)
2. NAK (05H)

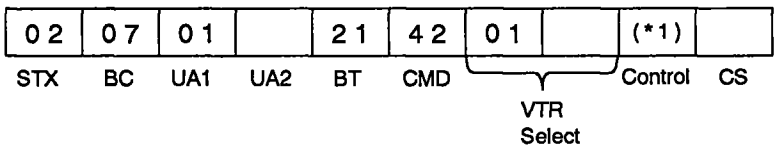
Name : Anti-clog Timer ON / OFF

BT : 21H

Command : 42H

Function : Turns the VTR's Anti-clog Timer ON or OFF.

Data configuration :



(*1) Control 00 : ON (Enable)
01 : OFF (Disable)

Return :

1. ACK (04H)
2. NAK (05H)

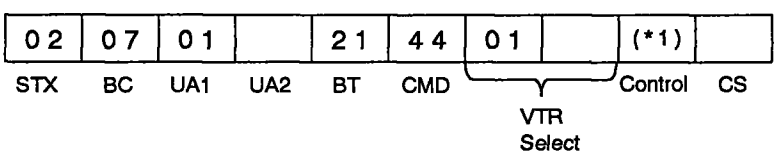
Name : Edit ON / OFF

BT : 21H

Command : 44H

Function : Turns the VTR's Edit Function ON or OFF.

Data configuration :



(*1) Control 00 : ON
01 : OFF

Return :

1. ACK (04H)
2. NAK (05H)

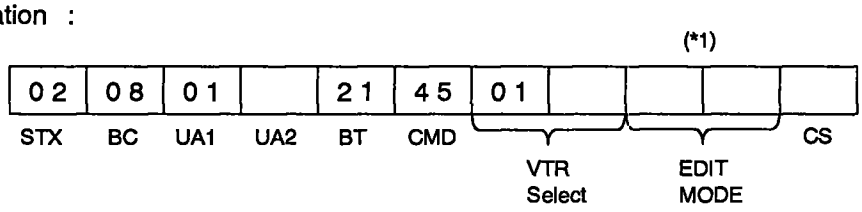
Name : Edit Preset

BT : 21H

Command : 45H

Function : Presets the VTR's Edit mode.

Data configuration :



(*1) Edit Mode (1 : Active, 0 : Not Active)

b7	b6	b5	b4	b3	b2	b1	b0
0	INS	ASMBL	VIDEO	A4	A3/TC	A2	A1

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	DA4	DA3	DA2	DA1

Return :

1. ACK (04H)
2. NAK (05H)

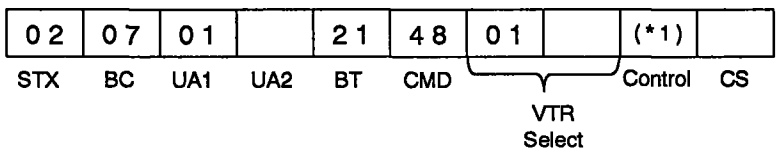
Name : Local Enable / Disable

BT : 21H

Command : 48H

Function : Sets whether the Local Function button to active or inactive in the Remote mode.

Data configuration :



(*1) Control 00 : ENABLE
01 : DISABLE

Return :

1. ACK (04H)
2. NAK (05H)

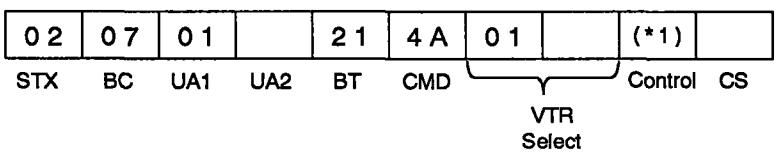
Name : TCG RUN / HOLD

BT : 21H

Command : 4AH

Function : Sets whether the Timecode Generator to the RUN mode or HOLD mode.

Data configuration :



(*1) Control 00 : RUN
01 : HOLD

Return :

1. ACK (04H)
2. NAK (05H)

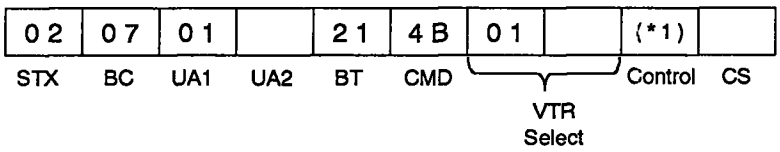
Name : FREEZE ON/OFF

BT : 21H

Command : 4BH

Function : Control the FREEZE memory ON/OFF that is sent to the VTR.

Data configuration :



(*1) Control 00 : RUN
01 : HOLD

Return :

1. ACK (04H)
2. NAK (05H)

Name : VITC Mode ON/OFF

BT : 21H

Command : 4FH

Function : Turns the VTR's VITC mode ON or OFF.

Data configuration :

02	07	01		21	4F	01		(*1)	
STX	BC	UA1	UA2	BT	CMD	VTR Select		Control	CS

(*1) Control 00 : ON
01 : OFF

Return :

1. ACK (04H)
2. NAK (05H)

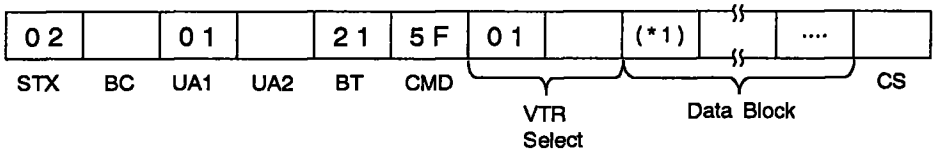
Name : VTR Through Command

BT : 21H

Command : 5FH

Function : This is the command to control VTR direct from the controller.

Data configuration :



(*1) Data Block

The commands and data that are specified in the VTR Protocol Manual are set as they are.

Example :

Send PLAY command Data Block to VTR : 20, 01

Return :

1. ACK (04H)
2. NAK (05H)

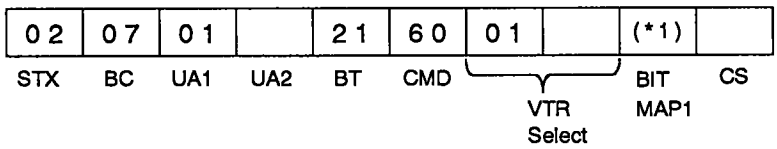
Name : Sense VTR Status

BT : 21H

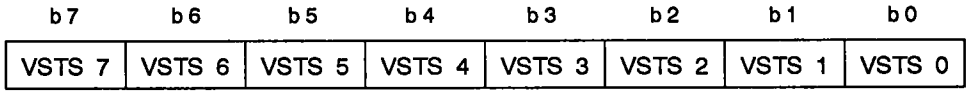
Command : 60H

Function : Requests status of the VTRs that are under control of the Flexicart.
The requested data can be designated in a bit map.

Data configuration :



(*1) BIT MAP

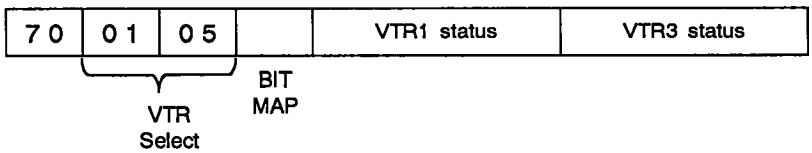


Return :

1. VTR Status Return (70H)

Remarks : When two or more bits of 2nd byte of VTR Select are set (two or more VTRs are specified), the Flexicart returns two or more VTR statuses simultaneously from lower order of the VTR number.

(Example)



Name : VTR Status Return

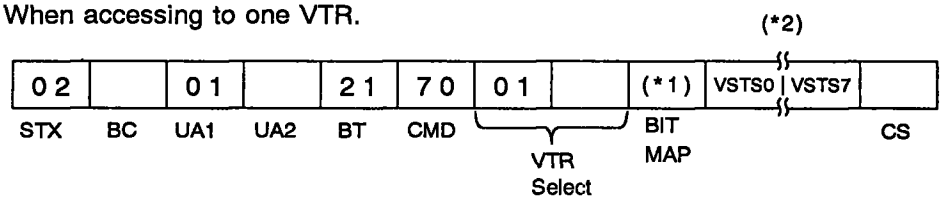
BT : 21H

Command : 70H

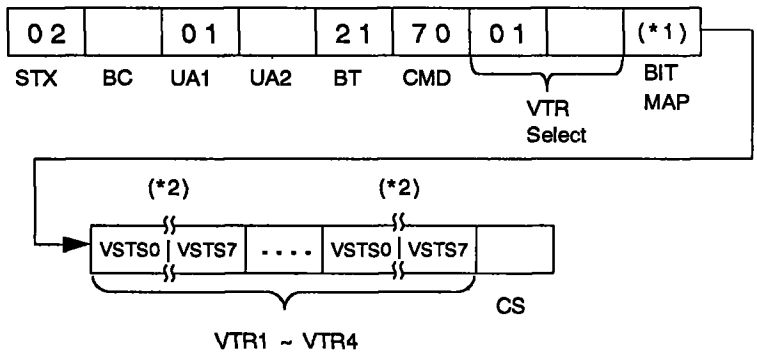
Function : Returns the VTR status of the VTRs that are under control of the Flexicart.

Data configuration :

1. When accessing to one VTR.



2. When accessing to two or more VTRs.



(*1) Same as the bit map for CMD "60H".

(*2) Refer to the VTR status MAP.

Request :

1. Sense VTR Status (60H)
2. NAK (05H)

VTR Status MAP

BIT / STATUS	7	6	5	4	3	2	1	0
VST0 (*1)	No Communication	TC Missing	Interpolated TC	No Board				0
			Tape Unthread	SERVO REF MISSING	TAPE TROUBLE	Hard Error		Local
	STANDBY	Tension Released	STOP	EJECT	REW	FF	REC	PLAY
	SERVO LOCK	TSO MODE	SHUTTLE	JOG	VAR	TAPE DIR	STILL	CUE UP
	SEL EE ON	FULL EE ON		EDIT	REVIEW	AUTO EDIT	PREVIEW	PREROLL
	AUTO EE MODE	INSERT	ASSEMBLE	VIDEO	SYNC/A4	A3	A2	A1
	BUZZER ALARM	LOST LOCK	NEAR EOT	EOT	CF LOCK	SERVO ALARM	SYSTEM ALARM	REC INHIBIT
VST1 (U/B Block Count)	1000's digit				100's digit			
	10's digit				1's digit			
VST4 (TC Data)	Frame × 10				Frame × 1			
	Second × 10				Second × 1			
	Minute × 10				Minute × 1			
	Hour × 10				Hour × 1			
VST5 (UB Data)	Lower Binary Group ⋮ Upper Binary Group							
VST6	Reserved							
	Reserved							
	Reserved							
	Reserved							
VST7	Reserved							
	Reserved							
	Reserved							
	Reserved							

(*1) The sense data that can be accessed depends on the types of VTRs.
For the detailed information, refer to the protocol mamual for each VTR.

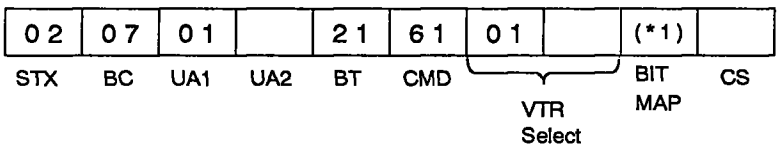
Name : Sense Expanded VTR Status

BT : 21H

Command : 61H

Function : Requests the expanded status of each VTRs that are under control of the Flexicart. The requested data can be designated using a bit map.

Data configuration :



(*1) BIT MAP

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	EVSTS 0

Return :

1. Expanded VTR Status Return (71H)
2. NAK

Remarks : When two or more bit of 2nd byte of VTR select are set, the Flexicart returns two or more expanded VTR statuses simultaneously starting from lower order of the VTR number.

Name : Expanded VTR Status Return

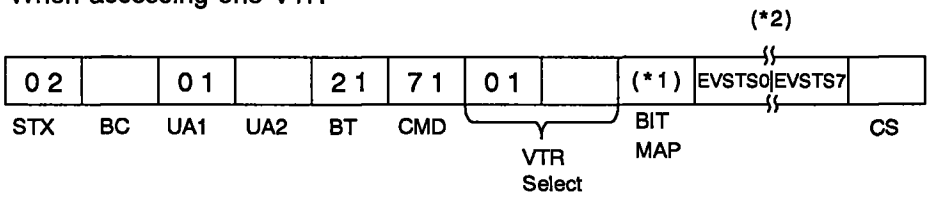
BT : 21H

Command : 71H

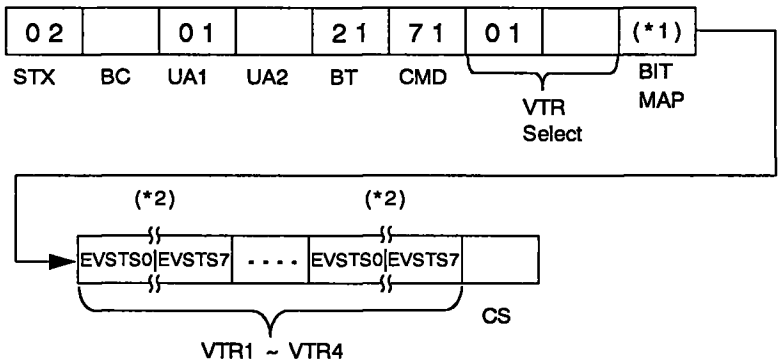
Function : Returns the Expanded status of the VTR that is under control of the Flexicart.

Data configuration :

1. When accessing one VTR



2. When accessing two or more VTRs



(*1) Same as the bit map for command (61H).

(*2) Refer to the Expanded VTR Status MAP.

Request :

1. Sense Expanded VTR Status (61H)

Expanded VTR Status MAP

BIT		b7	b6	b5	b4	b3	b2	b1	b0
EVSTS0	ALARM (*3)	OTHERS	CUE	AUDIO	VIDEO	POWER	SYSTEM	SERVO	TRANSPORT
	REC ERROR LEVEL (*4)	VALID	AUDIO ERROR LEVEL			VALID	VIDEO ERROR LEVEL		
	PB ERROR LEVEL (*5)	VALID	AUDIO ERROR LEVEL			VALID	VIDEO ERROR LEVEL		

(*3) ALARM

The corresponding bit is set to "1" when a trouble occurs to system.

(*4) REC ERROR LEVEL

Collate the recorded data with the CONFI HEAD playback data, and indicates the difference in the form of error level.

BIT-0 - BIT-2 shows the video data error level.

BIT-4 - BIT-6 shows the audio data error level.

BIT-2/1/0 (VIDEO) BIT-6/5/4 (AUDIO)	ERROR LEVEL
0	GOOD
4	NO GOOD

(*5) PB ERROR LEVEL

Indicates the error level of playback data

BIT-0 - BIT-2 shows the playback video data error level.

BIT-4 - BIT-6 shows the playback audio data error level.

BIT-2/1/0 (VIDEO) BIT-6/5/4 (AUDIO)	ERROR LEVEL
0	GOOD
1	ALMOST GOOD
2	INDETERMINABLE
3	DOUBTFUL
4	NO GOOD

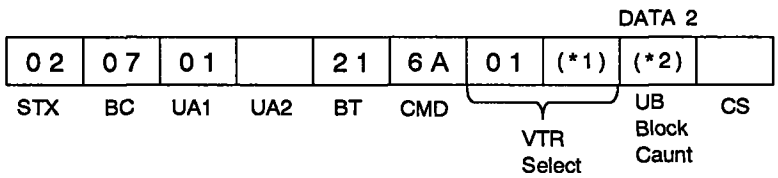
Name : Sense User's BIT Block DATA

BT : 21H

Command : 6AH

Function : Requests to send the user's bit block data which has been read using a VTR's macro command (UB read). The number of the requested user's bit blocks depends on the user's bit block count.

Data configuration :



(*1) When two or more bits are set to 1, only the data corresponding to the VTR at LSB is returned.

(*2) BCD Code 01 - 60

Return :

1. User's Bit Block Data Return (7AH)
2. NAK (05H)

Name : User's BIT Block DATA Return

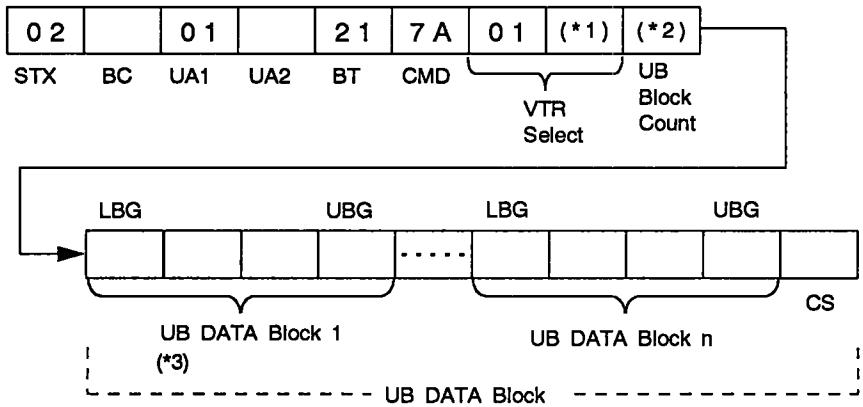
BT : 21H

Command : 7AH

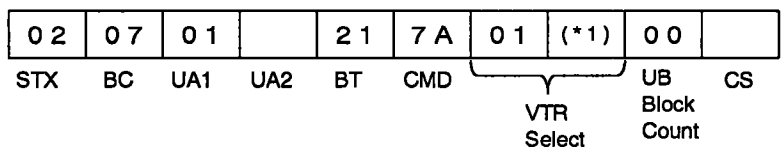
Function : Returns the user's bit block read data.

Data configuration :

1. When there exists a return data.



2. When there does not exist a return data.



(*1) When two or more bits are set to 1, the data corresponding to the VTR at LSB is returned, and only the bit corresponding to the VTR is set to 1 on the bit map.

(*2) BCD Code 01 - 60

(*3) For the UB Data Block format, refer to the UB Preset command (05H).

Return :

1. Sense User's BIT Block DATA (6AH)

Remarks :

1. If 61 or more user's bit block counts are requested, up to 60 data is returned.
2. When the user's bit block does not reach the requested number of user's block counts, only the number of existent user's bit data blocks is returned.

8-4. DETAILS OF FLEXICAFT COMMAND TO SWITCHER

8-4-1. Command Table

This command block defines the commands which are sent to the switchers that are under control of Flexicart. The command block format is shown below.

Command Block = CMD + Switcher select (+ DATA)

The Switcher Select corresponds to each bit.

b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	AUDIO 2 (CH 2)	AUDIO 1 (CH 1)	0	VIDEO 1

When two or more bits are set to Switcher Select, the commands are output to each switcher. The status data of designated switcher is returned by the bit map system.

COMMAND LIST when BT = 31H.

High / Low	0	1	2	3	4	5	6	7
0			Crosspoint Select					
1			Monitor Select				Sense Crosspoint Status	←
2								
3								
4							Sence SW'er Status	←
5	System Control Mode							
6								
7								
8								
9								
A								
B								
C								
D								
E								
F								

Name : Set System Control Mode

BT : 31H

Command : 05H

Function : Selects the switch timing of switchers that are under control of Flexicart.
The default value is 02H at the leading edge of field 1.

Data configuration :

02	07	01		31	05		01	(*1)	
STX	BC	UA1	UA2	BT	CMD	SW'er Select	BIT MAP	Control	CS

(*1) Control : Timing control of switching
00H : Immediately when a select switcher's command is received.
01H : At the leading edge of field 1 or 2.
02H : At the leading edge of field 1 (Default)
03H : At the leading edge of field 2

Return :
1. ACK (04H)
2. NAK (05H)

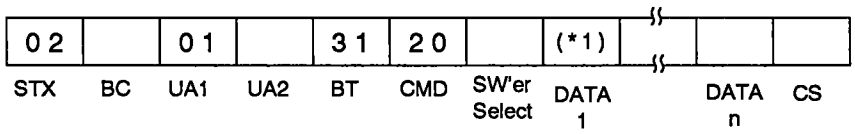
Name : Cross Point Select

BT : 31H

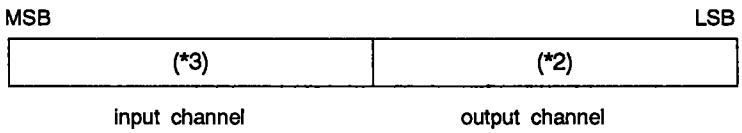
Command : 20H

Function : Selects the switcher's cross point that is under control of the Flexicart.
Selecting of one cross point can be designated by each data.
Continuous data enables two or more cross points to be controlled at the same time.

Data configuration :



(*1) DATA n



(*2) Output channel : Specify the output channel number
1H ~ EH
(1 ~ 14)

(*3) Input channel : Specify the input channel number
1H ~ FH (0H : Input channel No.16)
(1 ~ 15)

※ The maximum number of input/output channel depends on the switcher to control.
Refer to protocol manual of the switcher for details.

Return :

1. ACK (04H)
2. NAK (05H)

Name : Monitor Select Set

BT : 31H

Command : 21H

Function : Selects the line which is connected to the MONITOR OUT channel of the switcher that is under control of the Flexicart.

Data configuration :

02	06	01		31	21		(*1)	
STX	BC	UA1	UA2	BT	CMD	SW'er Select	DATA	CS

(*1) DATA

b7	b6	b5	b4	b3	b2	b1	b0
Channel No.							(*2)

(*2) : bit 0 = 0 ····· Source channel of the channel number displayed by bits 4 through 7.

1 ····· Destination channel of the channel number displayed by bits 4 through 7.

※ This command is unavailable for the switcher that does not have a monitor line.

Return : 1. ACK (04H)
2. NAK (05H)

Name : Sense Crosspoint Status

BT : 31H

Command : 61H

Function : Requests the select status of the switcher that is under control of the Flexicart.

Data configuration :

02	06	01		31	21			
STX	BC	UA1	UA2	BT	CMD	SW'er Select	BIT MAP	CS

(*1) Refer to the bit map for command (71H).

Return :

1. Crosspoint Select Return (71H)
2. NAK

Name : Crosspoint Select Return

BT : 31H

Command : 71H

Function : Returns the crosspoint select status of the switchers that is under control of the Flexicart.

Data configuration :

02		01		31	71		(*1)	(*2)			
STX	BC	UA1	UA2	BT	CMD	SW'er Select	BIT MAP	SSL0 ~ SSL7			CS

(*1) BIT MAP

b7	b6	b5	b4	b3	b2	b1	b0
SSL 7	SSL 6	SSL 5	SSL 4	SSL 3	SSL 2	SSL 1	SSL 0

(*2) Refer to the content of CROSSPOINT SELECT MAP.

Return : 1. Sense Crosspoint Select (61H)

CONTENT OF CROSSPOINT SELECT MAP

Bit / Status	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
SSL 0	Line Out 2 Assign Channel No. (1 to E Channnel Max)				Line Out 1 Assign Channel No. (1 to E Channnel Max)			
SSL 1	Line Out 4 Assign Channel No. (1 to E Channnel Max)				Line Out 3 Assign Channel No. (1 to EChannnel Max)			
SSL 2	Line Out 6 Assign Channel No. (1 to E Channnel Max)				Line Out 5 Assign Channel No. (1 to E Channnel Max)			
SSL 3	Line Out 8 Assign Channel No. (1 to E Channnel Max)				Line Out 7 Assign Channel No. (1 to E Channnel Max)			
SSL 4	Line Out 10 Assign Channel No. (1 to E Channnel Max)				Line Out 9 Assign Channel No. (1 to E Channnel Max)			
SSL 5	Line Out 12 Assign Channel No. (1 to E Channnel Max)				Line Out 11 Assign Channel No. (1 to E Channnel Max)			
SSL 6	Line Out 14 Assign Channel No. (1 to E Channnel Max)				Line Out 13 Assign Channel No. (1 to E Channnel Max)			
SSL 7 *3	Monitor Out Assign CHNL.NO. (in/out)							
	1 to E Channnel Max				0	0	0	0 = IN 1 = OUT

(*3) For the swiecher equipped a monitor output channel.

※ Refer to the switcher's protocols manuals for details.

Name : Sense SW'er Status

BT : 31H

Command : 64H

Function : Requests the status of the switcher that is under control of Flexicart.

Data configuration :

02	06	01		31	64		(*1)	
STX	BC	UA1	UA2	BT	CMD	SW'er Select	BIT MAP	CS

(*1) Refer to the bit map for command (74H).

Return :

1. SW'er Status Return (74H)
2. NAK (05H)

Name : SW'er Status Return

BT : 31H

Command : 74H

Function : Returns the status of the switcher that is under control of Flexicart.

Data configuration :

02		01		31	74		(*1)	(*2)			
STX	BC	UA1	UA2	BT	CMD	SW'er Select	BIT MAP	SSL0 ~ SSL7			CS

(*1) BIT MAP

b7	b6	b5	b4	b3	b2	b1	b0
SSL 7	SSL 6	SSL 5	SSL 4	SSL 3	SSL 2	SSL 1	SSL 0

(*2) Refer to the content of SWITCHER STATUS Map.

Return :

1. Sense SW'er Status (64H)

SWITCHER STATUS MAP

SWITCHER STATUS	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
SST 0	REF MISSING		No Communication					Undefined CMD
SST 1								
SST 2								
SST 3								
SST 4								
SST 5								
SST 6								
SST 7								

※ SST 1 - SST 7 are reserved.

Appendix-1. Macro End Information

1. Definition of Terminology

(1) Internal Cause

A macro could not be executed because of a mechanical or electrical problem in the target device.

(2) External Cause

A macro could not be executed because the necessary condition were not satisfied.

(3) Before execution

The macro is stored in the command buffer of the Flexicart, but has not yet been sent to the target device.

(4) During execution

Any time after the first command of the macro has been sent to the target device.

(5) Cancel

The cancel command stopped execution of the macro.

2. Classification of Macro End Information

(1)	F0H to FFH	End Information common to all macro commands.
(2)	E0H to EFH	Undefined.
(3)	C0H to DFH	End information when an internal cause stops a macro before execution.
(4)	A0H to BEH	End information when an internal cause stops a macro during execution.
(5)	80H to 9FH	End information defined separatley for each macro when an internal cause stops a macro.
(6)	70H to 7FH	Undefined.
(7)	60H to 6FH	Undefined.
(8)	40H to 5FH	End information when an external cause stops a macro before execution.
(9)	20H to 3FH	End information when an external cause stops a macro during execution.
(10)	01H to 1FH	End information defined separately for each macro when an external cause stops a macro.
(11)	00H	Shows that execution of a maro ended normally.

3. List of Macro End Information Concerning The Cassette Console

Macro End Information Concerning the Cassette Console : Table No.1

High / Low	0	1	2	3	4	5	6	7
0	Normal End							
1								
2					CMD Data Error 1			
3			Disterbed					
4			VTR Eject Time Out 2	Bin Not Initialize 2		Bin Not Initialize 1		
5								
6								
7					Initializeing 1	Test Mode 1		
8			Servo Off 2	Door Open 2	Servo Off 1	Door Open 1		
9			Cassette Size Error 2		Cassette Size Error 1	Bin Type Error 1		
A						No Bin 1		
B				Cassette Exist in Elevator 2		Cassette Exist in Elevator 1		
C								
D								
E		Initialize Error		Desti. Bin Cassette Exist 2		Desti. Bin Cassette Exist 1		
F		Can't Read Barcode	No Communi. with C.C 2	Source Bin No Cassette 2	No Communi. with C.C 1	Source Bin No Cassette 1		

Macro End Information Concerning the Cassette Console : Table No.2

High / Low	8	9	A	B	C	D	E	F
0				Power Down 2		Power Down 1		
1								
2								
.3								
4								
5								
6				Barcode Reader Trouble 2		Barcode Reader Trouble 1		
7			Elevator is not connected 2	Elevator Trouble 2	Elevator is not connected 1	Elevator Trouble 1		
8				Servo Trouble 2		Servo Trouble 1		
9								Number In use
A				Desti. Bin Trouble 2		Desti. Bin Trouble 1		Abnormal End
B				Source Bin Trouble 2		Source Bin Trouble 1		Impossible to Execute
C			VTR Communication Error 2		VTR Communication Error 1			Busy
D								Number Unknown
E								CMD Cancel 2
F				Bin Trouble 2		Bin Trouble 1		CMD Cancel 1

4. Details of Macro End Information concerning the Cassette Console

1) When a macro terminates normally

00H : Normal End

Execution has ended normally.

2) The macro end information specific to one command

(1) For the Elavator Initialize command

1EH : Initialize Error

A bin unit or VTR could not be initialized.

(2) For the Cassette Move with Barcode Read command

1FH : Can't Read Barcode

A bar code label could not be read.

3) External Causes

23H : Disturbed

The macro could not be executed due to panel operation, etc.

24H : VTR Eject Time Out 2 (during execution)

A cassette was not ejected within 60 seconds.

42H : CMD Data Error 1 (before execution)

The command data is invalid.

47H : Initializing 1 (before execution)

The command cannot be processed bacuse the elavator is being initialized.

48H : Servo Off 1 (before execution)

28H : Servo Off 2 (during execution)

A servo has turned off for some reason.

49H : Cassette Size Error 1 (before execution)

29H : Cassette Size Error 2 (during execution)

The cassette size is not correct.

4FH : No Communi. with C.C 1 (before execution)

2FH : No Communi. with C.C 2 (during execution)

Control is not possible because of a communication error between VCC and C.C.(Cassette Console)

54H : Bin Not Initialize 1 (before execution)
Control is not possible because the specified bin has not been initialized.

57H : Test Mode 1 (before execution)
Control is not possible bacause the Flexicart is in test mode.

58H : Door Open 1 (before execution)
38H : Door Open 2 (during execution)
Control is not possible because the Flexicart door is open.

5AH : No Bin 1 (before execution)
The specified bin does not exist.

5BH : Cassette Exist in Elevator 1 (before execution)
3BH : Cassette Exist in Elevator 2 (during execution)
Control is not possible because there is a cassette in the elevator.

5EH : Desti. Bin Cassete Exist 1 (before execution)
3EH : Desti. Bin Cassete Exist 2 (during execution)
The destination bin already has a cassette.

5FH : Source Bin No Cassette 1 (before execution)
3FH : Source Bin No Cassette 2 (during execution)
The source bin has no cassette.

59H : Bin Type Error 1 (before execution)
Device Type is not specified as source/destination is not spported.

4) Internal Causes

C7H : Elavator not connected 1 (before execution)
A7H : Elavator not connected 2 (during execution)
The elavator block is not connected to the Flexicart.

CCH : VTR Communication Error 1 (before execution)
ACH : VTR Communication Error 2 (during execution)
VCC cannot communicate with the source or destination VTR.

D0H : Power Down 1 (before execution)
B0H : Power Down 2 (during execution)
A momentary power interruption occurred.

D6H : Barcode Reader Trouble 1 (before execution)
B6H : Barcode Reader Trouble 2 (during execution)
Mechanical or electrical trouble occurred in the barcode reader.

DAH : Destination Bin Trouble 1 (before execution)
BAH : Destination Bin Trouble 2 (during execution)
Mechanical ro electrical trouble occurred in the destination bin during cassette movement.

DBH : Source Bin Trouble 1 (before execution)
BBH : Source Bin Trouble 2 (during execution)
Mechanical or electrical trouble occurred in the source bin during cassette movement.

D7H : Elevator Trouble 1 (before execution)
B7H : Elevator Trouble 2 (during execution)
Mechanical or electrical trouble occurred in the elevator.

D8H : Servo Trouble 1 (before execution)
B8H : Servo Trouble 2 (during execution)
Mechanical or electrical trouble occurred in the C.C. servo system.

DFH : Bin Trouble 1 (before execution)
BFH : Bin Trouble 2 (during execution)
The elavator cannot move because of a casstte protrusion.

F9H : Number In Use
The specified macro number is already being used.

FAH : Abnormal End
The macro ended abnormally for some reason.

FBH : Impossible to Execute
The macro cannot be executed for some reason.

FCH : Busy
The number of received macros has reached the maximum.

FDH : Number Unknown
The specified macro number does not exist.

FFH : CMD Cancel 1 (before execution)
FEH : CMD Cancel 2 (during execution)
The macro has been canceled.

5. List of Macro End Information Concerning VTRs

Macro End Information Concerning VTRs : No.1

High / Low	0	1	2	3	4	5	6	7
0	Normal End		Other Condition Error 2		Other Condition Error 1			
1	FRAME ERROR							
2	FRAME ERROR		CMD Data Error 2		CMD Data Error 1			
3	FRAME ERROR		Disturbed	Lost Lock 2				
4	FRAME ERROR			Tape End 2				
5	FRAME ERROR							
6	FRAME ERROR			FREEZE Off Time Out				
7	FRAME ERROR			VTR Local 2		VTR Local 1		
8	FRAME ERROR			Tape Trouble 2		Tape Trouble 1		
9	FRAME ERROR			No Reserved T.C.				
A	FRAME ERROR			No Time Code 2				
B	FRAME ERROR	UB Read Data Sense Request		Rec. Inhibit 2		Rec. Inhibit 1		
C	FRAME ERROR	Behind T.C.	Buzzer Alarm 2	Servo Unlock	Buzzer Alarm 1			
D	FRAME ERROR	Interpolated End	Ref Missing 2	Time Out 2	Ref Missing 1			
E	FRAME ERROR	Receive Area Full						
F	FRAME ERROR	No Save Area	No Communication with VTR 2	Tape Unthread 2	No Communication with VTR 1	Tape Unthread 1		

Macro End Information Concerning VTRs : No.2

High / Low	8	9	A	B	C	D	E	F
0			Others Hard Trouble 2		Others Hard Trouble 1			
1								Delayed Executed
2								
3								
4				Cue Trouble 2		Cue Trouble 1		
5				Audio Trouble 2		Audio Trouble 1		
6				Video Trouble 2		Video Trouble 1		
7				System Trouble 2		System Trouble 1		
8				Servo Trouble 2		Servo Trouble 1		
9				Transport Trouble 2		Transport Trouble 1		Number In use
A								Abnormal End
B								Impossible to Execute
C								Busy
D								Number Unknown
E								CMD Cancel 2
F								CMD Cancel 1

6. Details of Macro Information Concerning VTRs

1) Macro End Information due to Internal or External Cause of VTR

23H : Disturbed
Execution was not completed because the VTR received another command from the VCC or control panel.

33H : Lost Lock 2 (during execution)
A servo error occurred during execution.

34H : Tape End 2 (during execution)
Event execution stopped because the tape reached tape top or tape end.

36H : FREEZE OFF Time Out
The VTR did not respond to a Freeze Off Command within the defined time.

39H : No reserved T.C
The specified timecode is not exist.

3CH : Servo Unlock
Even though the VTR's target time code had not elapsed, the VTR's servo did not lock to the reference video signal within the specified time.

3DH : Time Out 2 (during execution)
The VTR could not be synchronized within the defined time.

40H : Other Error Condition 1 (before execution)
20H : Other Error Condition 2 (during execution)
An external cause for which no code is defined stopped the macro.

42H : CMD Data Error 1 (before execution)
22H : CMD Data Error 2 (during execution)
The command data is invalid.

4CH : Buzzer Alarm 1 (before execution)
2CH : Buzzer Alarm 2 (during execution)
The buzzer is sounding because a mechanical or electrical trouble has occurred.

4DH : Ref. Missing 1 (before execution)
2DH : Ref. Missing 2 (during execution)
The VTR cannot detect the reference signal.

4FH : No communication with VTR 1 (before execution)
2FH : No communication with VTR 2 (during execution)
Control is not possible because of a communication error between Flexicart and VTR.

57H : VTR LOCAL 1 (before execution)
37H : VTR LOCAL 2 (during execution)
Control is not possible because the Remote/Local switch on the VTR is set to Local.

58H : Tape Trouble 1 (before execution)
38H : Tape Trouble 2 (during execution)
A problem, such as the tape sticking to the drum head, has occurred in the VTR.

5BH : Rec. Inhibit 1 (before execution)
3BH : Rec. Inhibit 2 (during execution)
Recording is not possible because the VTR or cassette is in Record inhibit mode.

5FH : Tape Unthread 1 (before execution)
3FH : Tape Unthread 2 (during execution)
Control is not possible bacause the tape is not threaded in the VTR.

C0H : Trouble 1 (before execution)
A0H : Tourble 2 (during execution)
Some other kind of mechnical or electrical trouble has occurred in the VTR.

D4H : Cue Trouble 1 (before execution)
B4H : Cue Trouble 2 (during execution)
Mechnical or electrical trouble has occurred in the VTR's cue system.

Note) These codes are defined for digital VTRs only.

D5H : Audio Trouble 1 (before execution)
B5H : Audio Trouble 2 (during execution)
Mechanical or electrical trouble has occurred in the VTR's audio system.

Note) These codes are defined for digital VTRs only.

D6H : Video Trouble 1 (before execution)
B6H : Video Trouble 2 (during execution)
Mechanical or electrical trouble has occurred in the VTR's video system.

Note) These codes are defined for digital VTRs only.

D7H : System Trouble 1 (before execution)
B7H : System Trouble 2 (during execution)
Mechanical or electrical trouble has occurred in the VTR's conctrol system.

Note) These codes are defined for digital VTRs only.

D8H : Servo Trouble 1 (before execution)
B8H : Servo Trouble 2 (during execution)
Mechanical or electrical trouble has occurred in the VTR's servo system.

Note) These codes are defined for digital VTRs only.

D9H : Transport Trouble 1 (before execution)
B9H : Transport Trouble 2 (during execution)
Mechanical or electrical trouble has occurred in the VTR's tape transport system.

Note) These codes are defined for digital VTRs only.

F1H : Delayed Executed
Execution was not started within the defined time.

F9H : Number In Use
The specified macro number is already being used.

FAH : Abnormal end
The macro ended abnormally for some reason.

FBH : Inpssible to execute
The macro cannot execute for some reason.

FCH : Busy
The number of macros has reached the maximum.

FDH : Number Unknown
The specified macro number dose not exist.

FFH : CMD cancel 1 (before execution)
FEH : CMD cancel 2 (during execution)
The macro has been canceled.

2) Macro End specific to one Command

(1) Information Related to the U.B. Write Command

1FH (No Save Area)
There is insufficient space for U.B. data.

1CH (Behind T.C)
The command was received after the specified timecode had elapsed.

(2) Information Related to the U.B. Read Command

1EH (Receive Area Full)
There is insufficient space for U.B. data that was read from the VTR.

1DH (Interpolated end)
An interpolated timecode occurred.

1CH (Behind T.C)
The command was received after the specified timecode had elapsed.

1BH (U.B Read Data Sense Request)
There is U.B. data to be sensed.

3) Sync. Play

01H ~ 0FH (Frame Error) *
Frame Error

33H (Lost Lock)
Lost Lock

34H (Tape End)
Tape End

3BH (REC Inhibit 2)
Rec Inihibit

3CH (Servo Lock 2)
Servo does not lock.

3DH (Time Out 2)
Phase lock does not complete.

5BH (REC Inhibit 1)
Recording is inhibited.

4) Auto Edit

01H ~ 0FH (Frame Error) *
Frame Error

33H (Lost Lock)
Servo has lost lock.

34H (Tape End)
Tape End

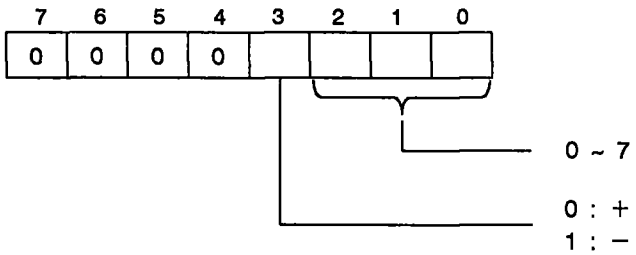
3BH (REC Inhibit 2)
Recording is inhibited.

3CH (Servo Lock 2)
Servo does not lock.

3DH (Time Out 2)
Phase lock does not complete.

5BH (REC Inhibit 1)
Recording is inhibited.

* Description of 01H - 0FH (Frame Error)



Appendix-2. Turn On End Information

FFH : CMD Cancel 1
FEH : CMD Cancel 2
FDH : Turn On No. Unknown
FCH : Busy
FBH : Impossible to Execute
FAH : Abnormal End
F9H : Turn On No. In Use
F1H : Delayed Executed
00H : Normal End

Appendix-3. Error Code

Detailed Description of Error Code

Elevator (Device Number : 0001)

0011 : The elevator is not connected
0012 : The size and the type of a cassette being stored by the elevator cannot be identified. The Flexicart cannot operate until this cassette is removed.
0016 : The Flexicart hand is not holding a cassette correctly.
0021 : Pulses from the X-axis encoder cannot be detected.
0022 : Pulses from the Z-axis encoder cannot be detected.
0023 : Pulses from the hand encoder cannot be detected.
0024 : The elevator cannot detect the home position of X-axis.
0025 : The elevator cannot detect the home position of Z-axis.
0026 : The cassette detect sensor is defective.
0032 : The limit sensor of the hand is defective.

BIN (Device Number : 1001 ~ 9999)

0011 : The elevator tried to take a cassette out but failed.
0012 : The elevator tried to load a cassette into the bin but failed.
0021 : The elevator loaded a cassette into the bin but cannot detect "cassette in" state.

IF-373 (Device Number : A000)

0011 : The board is not installed in the correct slot.
0012 : The board is not ready to work.

BIN Controller (Device Number : A200)

D1/D2 CASSETTE

0001 : The bin unit, corresponding to bins No. 01x through 04x is not connected to the bin controller or cannot be recognized.
0002 : 05x through 08x
0003 : 09x through 12x
0004 : 13x through 16x
0005 : 17x through 20x
0006 : 21x through 24x
0007 : 25x through 28x
0008 : 29x through 32x

BETA/S-VHS CASSETTE

0001 : The bin unit, corresponding to bins No. 01x through 05x is not connected to the bin controller or cannot be recognized.

0002 : 06x through 10x

0003 : 11x through 15x

0004 : 16x through 20x

0005 : 21x through 25x

0006 : 26x through 30x

0007 : 31x through 35x

0008 : 36x through 40x

PROTRUSION (Device Number : B000)

0010 : The cassette protrusion detector is not connected to the Flexicart.

0020 : A cassette is protruding.

Elevator Initializing (Device Number : F000)

0001 : The initial sensor of Y-axis is defective.

0002 : The Flexicart tried to detect the home position of Y-axis but failed.

0010 : A cassette is left in a VTR cassette slot.

Servo (Device Number : A020)

0022 : The servo driver has overheated.

0023 : The Y-motor protection thermal relay has overheated.

0071 : The servo turned off because moving in Y-direction could not follow the commands.

0072 : The servo turned off because it could not keep the elevator stopped at the designated position.

0073 : The servo turned off because Y-motor encoder pulse was not detected.

0074 : The servo turned off because the Y-motor acceleration exceeded the specified value.

0081 : Temporary interruption to the power supply was occurred.

CK-39 (Device Number : A040)

0011 : No reference video signal is input to the board.

0012 : The board is not ready for operation.

COMMON MEMORY (Device Number : C010)

0018 : The Flexicart cannot access common memory on the CPU-118 board.

0017 : The Flexicart cannot access common memory on the DP-178 board

0024 : The Flexicart connot access common memory of the RD-24 board
0031 : The Flexicart cannot access common memory on the first IF-373 board
0032 : The Flexicart cannot access common memory on the second IF-373 board
0033 : The Flexicart cannot access common memory on the third IF-373 board
0034 : The Flexicart cannot access common memory on the fourth IF-373 board

SELF DIAGNOSIS (Device Number : C000)

xxxx (xx slot number) :

Indicates the slot number where an error occurred during self diagnosis.

VTR (Device Number : 01xx)

0011 : The elevator tried to take a cassette out from VTR but failed.
0012 : The elevator tried to load a cassette into the VTR but failed.
0021 : The elevator loaded a cassette into the VTR but cannot detect it.
0022 : The VTR cannot eject a cassette.

Barcode (Device Number : A300)

0011 : The header is not connected to the hand or defective.

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