SONY.

VIDEOCASSETTE RECORDER
VIDEOCASSETTE PLAYER

U-matic SERIES
U-matic SP SERIES

U·matic

U·matic SP

PROTOCOL OF REMOTE-1 (9 Pin) CONNECTOR
1st Edition

The U-matic and U-matic SP series VTR, Remote Control Connector Panel, incorporates a 9-pin D-Subminiature connector designated a REMOTE-1. This connector is utilized in a serial control system. The contents of the serial Protocol/Command sequence is explained in this manual.

The definition of the CONTROLLER and DEVICE shall be as follows.
"CONTROLLER" means the unit which controls the VTR.
"DEVICE" means the unit (VTR) which is controlled.
ex. 1) When the U-matic and U-matic SP series VTRs are connected by REMOTE-1 (9 pin) connector, the VTR on the recorder means CONTROLLER and the VTR on the player means DEVICE.
ex. 2) When the controller for editing is connected to one or more U-matic and U-matic SP series VTR(s), this controller for editing means CONTROLLER and one or more VTR(s) means DEVICE.

1. INTERFACE SYSTEM OVERVIEW.

. Conforming to EIA RS-422A.
. Four-wire communications channel is utilized.
. Data is transmitted asynchronously, bit serial, word serial with data transmissions between devices being digital.
. Standard transmission rate on the interface bus is 38.4 kilobits per second (kb/s).
. The data words utilized by the interface system shall be as follows:

1 START Bit + 8 DATA Bits + 1 PARITY Bit + 1 STOP Bit

START BIT	D0 (LSB)	D1	D2	D3	D4	D5	D6	D7 (MSB)	PARITY (ODD)	STOP BIT

MARK / SPACE
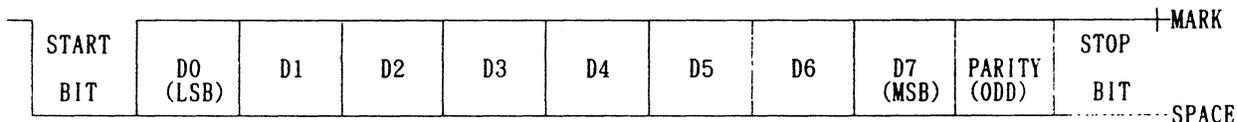
ODD parity ... The total of D0 + D1 + ... + D7 + Parity Bit equals an odd number.

NOTE: The contents of this manual also conform to PAL and PAL-M models.

2. COMMAND BLOCK FORMAT (CMD BLOCK)

The communication between the CONTROLLER and the DEVICE is composed of CMD 1/DATA COUNT, CMD 2 and DATA CHECKSUM, and is transmitted from CMD 1/DATA COUNT in order. When the DATA COUNT is zero, the DATA is not transmitted. When it is not zero, the DATA corresponding to the value is inserted between CMD 2 and CHECKSUM.

MSD   LSD

CMD 1	DATA COUNT	CMD 2	DATA 1	(	DATA N (N=MAX. 15)	CHECKSUM
←— 1 BYTE —→		←— 1 BYTE —→	←— 1 BYTE —→	←—	←— 1 BYTE —→	←— 1 BYTE —→
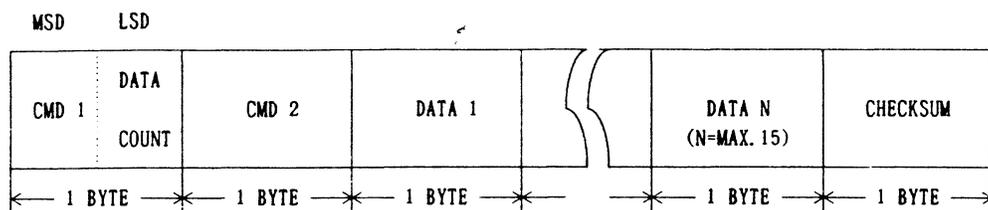
CMD 1   :CMD 1 classifies the COMMAND into the main groups which indicates the Function and Direction of the data words to follow.

CMD 1	FUNCTION	DIRECTION CONTROLLER DEVICE
0	SYSTEM CONTROL	—————————→
1	SYSTEM CONTROL RETURN	←—————————
2	TRANSPORT CONTROL	—————————→
4	PRESET & SELECT CONTROL	—————————→
6	SENSE REQUEST	—————————→
7	SENSE RETURN	←—————————

DATA COUNT :DATA COUNT indicates the number of data words added following CMD 2. (0 to FH)

CMD 2   :CMD 2 is the designated COMMAND to the DEVICE or the COMMAND returned from the DEVICE.

DATA   :The number of data words and their contents are defined by the specific CMD 2.

CHECKSUM   :CHECKSUM is the sum of the DATA (D0 to D7) contained in each data word, from CMD 1 /DATA COUNT to the last data word before CHECKSUM. CHECKSUM is used to verify DATA accuracy and reject communication sequences that contain bit errors.

3. CONNECTOR PIN ASSIGNMENT

Interface connector : 9 pin D-subminiature female (D-9S).

The pin assignment for the CONTROLLER and the DEVICE shall be as shown in the following table.
The U-matic and U-matic SP series VTR had the function as CONTROLLER (BVU-950) is become pin assignment of CONTROLLER when the RECORDER or PLAYER lamp on the control panel is lit.
Except for that, it's become the pin assignment of DEVICE.
The VTR not had the function as the CONTROLLER (BVU-900, BVU-920, VO-9800 and VO-9850) is always become the pin assignment of DEVICE.

Signal Pin	CONTROLLER	DEVICE
1	Frame Ground	Frame Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	Spare	Spare
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Frame Ground	Frame Ground

①
⑥
②
⑦
③
⑧
④
⑨
⑤
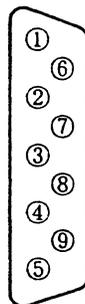
(EXTERNAL VIEW)

A and B shall be as follows.
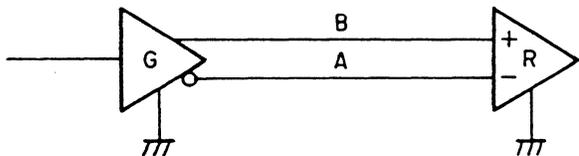
B
A
G
+
R
−

4. COMMUNICATION PROTOCOL

(1) All communications between the CONTROLLER and the DEVICE will be under the direct supervision of the CONTROLLER.
When the DEVICE (U-matic and U-matic SP series VTR) receives a COMMAND sent from the CONTROLLER, the following COMMAND is returned.
. In case that the DEVICE receives the COMMAND not requiring the data ... ACK
. In case that the DEVICE receives the COMMAND requiring the data... COMMAND + DATA
. In case that an error communication is detected or an undefined COMMAND is received ...
NAK + ERROR DATA

(2) The CONTROLLER shall not transmit additional COMMAND blocks to the DEVICE (U-matic and U-matic SP series VTR) prior to receiving an appropriate response to a previous COMMAND block.

(3) The CONTROLLER shall not interrupt transmission of a byte in a COMMAND block for more than 10 msec. A DEVICE (U-matic and U-matic SP series VTR) detecting an interruption of a byte in a COMMAND block that exceeds 10 msec. shall execute a TIME-OUT error sequene. A DEVICE shall void the receiving COMMAND block and transmit a NAK (TIME OUT).

(4) A DEVICE, following receipt of a COMMAND block from the CONTROLLER (U-matic and U-matic SP series VTR) shall transmit a response within 9 msec. If the CONTROLLER cannot receive the appropriate response from the DEVICE within 10 msec. after performing the COMMAND block transmission, it will execute as the communication is not performed under the normal condition, and shall process as necessary.

(5) The DEVICE, upon detection of an error, shall immediately transmit a NAK to the CONTROLLER. (The contents of an error are shown on the COMMAND TABLES.)
The CONTROLLER, upon receipt of NAK, shall immediately stop transmission of the COMMAND block.
The device, following transmission of NAK, receives a subsequent COMMAND block within 10 msec. (except NAK-UNDEFINED COMMAND) and shall process as necessary.

5. COMMAND TABLES

The marks shown in the tables mean the following.

1) ○ marked COMMAND's model can correspond.   If the contents are in the RETURN column, RETURN + DATA will be returned.   If the contents are not in the RETURN column, "10.01 : ACK" will be returned.

2) △ marked COMMAND returns ACK as RETURN, but don't operate.

3) × marked COMMAND doesn't correspond to the VTR "11.12.01 : NAK UNDEFINED" is returned.

COMMAND	RETURN	BVU-950	BVU-900	BVU-920	VO-9850	VO-9800
00.0C:LOCAL DISABLE	○ → 10.01:ACK	○	○	○	○	○
00.1D:LOCAL ENABLE		○	○	○	○	○
00.11:DEVICE TYPE REQUEST	12.11:DEVICE TYPE RETURN (UPPER:NTSC LOWER:PAL)	10.1C 11.1C	10.80 11.80	10.19 11.19	10.4C 11.4C	10.48 11.48
20.00:STOP		○	○	○	○	○
20.01:PLAY		○	○	○	○	○
20.02:REC		○	△	△	○	∗1○
20.04:STANDBY OFF		○	○	○	○	○
20.05:STANDBY ON		○	○	○	○	○
20.0F:EJECT		○	○	○	○	○
20.10:FAST FORWARD		○	○	○	○	○
2X.11:JOG FWD		○	○	○	○	○
2X.12:VAR FWD		○	○	○	○	○
2X.13:SHUTTLE FWD		○	○	○	○	○
20.20:REWIND	○. △ → 10.01:ACK × → 11.12.01:NAK UNDEFINED	○	○	○	○	○
2X.21:JOG REV		○	○	○	○	○
2X.22:VAR REV		○	○	○	○	○
2X.23:SHUTTLE REV		○	○	○	○	○
20.30:PREROLL		○	○	○	○	○
24.31:CUE UP WITH DATA		○	○	○	○	○
20.40:PREVIEW		○	△	△	○	△
20.41:REVIEW		○	△	△	○	△
20.42:AUTO EDIT		○	△	△	○	△
20.54:ANTI-CLOG TIMER DISABLE		○	○	○	○	○
20.55:ANTI-CLOG TIMER ENABLE		○	○	○	○	○
20.60:FULL EE OFF		○	△	△	○	○
20.61:FULL EE ON		○	△	△	○	○

∗1 Edit COMMAND operates as the DUB COMMAND in this VTR.

COMMAND	RETURN	BVU-950	BVU-900	BVU-920	VO-9850	VO-9800
20.63:SELECT EE ON		○	△	△	○	○
20.64:EDIT OFF		○	△	△	○	○
20.65:EDIT ON		○	△	△	○	*1○
44.00:TIMER-1 PRESET *2		○	○	○	○	○
44.04:TIME CODE PRESET		○	△	△	○	△
44.05:U-BIT PRESET		○	△	△	○	△
40.08:TIMER-1 RESET *2		○	○	○	○	○
20.6A:FREEZE OFF		○	○	○	×	×
20.6B:FREEZE ON		○	○	○	×	×
40.10:IN ENTRY		○	○	○	○	○
40.11:OUT ENTRY		○	○	○	○	○
44.14:IN PRESET		○	○	○	○	○
44.15:OUT PRESET		○	○	○	○	○
40.18:IN SHIFT +		○	○	○	○	○
40.19:IN SHIFT -		○	○	○	○	○
40.1A:OUT SHIFT +	○, △ → 10.01:ACK × → 11.12.01:NAK UNDEFINED	○	○	○	○	○
40.1B:OUT SHIFT -		○	○	○	○	○
40.20:IN RESET		○	○	○	○	○
40.21:OUT RESET		○	○	○	○	○
40.24:IN RECALL		○	○	○	○	○
40.25:OUT RECALL		○	○	○	○	○
41.30:EDIT PRESET		○	△	△	○	△
44.31:PREROLL TIME PRESET		○	○	○	○	○
41.35:COLOR FRAME SELECT		○	○	○	○	×
41.36:TIMER MODE SELECT		○	○	○	○	○
41.37:INPUT CHECK		○	△	△	○	○
40.40:AUTO MODE OFF		○	○	○	○	○
40.41:AUTO MODE ON		○	○	○	○	○
40.48:VIDEO REFERENCE DISABLE OFF		○	△	△	○	○
40.49:VIDEO REFERENCE DISABLE ON		○	△	△	○	○
61.0A:TC GEN DATA SENSE	74.08:GEN. TC DATA	○	×	×	○	×
	74.09:GEN. UB DATA	○	×	×	○	×
	78.08:GEN. TC & UB DATA	○	×	×	○	×

*1 Edit COMMAND operates as the DUB COMMAND in this VTR.
*2 All COMMANDs for TIMER-2 are applied for TIMER-1.

COMMAND	RETURN	BVU-950	BVU-900	BVU-920	VO-9850	VO-9800
61.0C:CURRENT TIME SENSE	70.0D:REQUEST TIME DATA MISSING ‡3	O	O	O	O	O
	74.00:TIMER-1 ‡3	O	O	O	O	O
	74.04:LTC TIME ‡3	O	O	O	O	O
	74.05:LTC UBIT ‡3	O	O	O	O	O
	74.14:LTC INTERPOLATED ‡3	O	O	O	O	O
	78.04:LTC TIME & UBIT ‡3	O	O	O	O	O
	78.14:LTC INTERPOLATED TIME & UBIT ‡3	O	O	O	O	O
60.10:IN DATA SENSE	74.10:IN DATA	O	O	O	O	O
60.11:OUT DATA SENSE	74.11:OUT DATA	O	O	O	O	O
60.30:EDIT PRESET SENSE	71.30:EDIT PRESET DATA	O	O	O	O	O
60.31:PREROLL TIME SENSE	74.31:PREROLL TIME DATA	O	O	O	O	O
60.36:TIMER MODE SENSE	71.36:TIMER MODE STATUS	O	O	O	O	O
61.20:STATUS SENSE	7X.20:STATUS DATA	O	O	O	O	O

‡3 When any of LTC, TIMER-1, TIMER-2, and LTC UBIT data is requested, the RETURN data is sent back. When data other than the above is requested, REQUEST DATA MISSING (70.0D) is sent back.

00.0C : LOCAL DISABLE

When receiving this command, all functions of the DEVICE will be disabled.

00.1D : LOCAL ENABLE

When receiving this command, the control panel operation will be enabled according to the DEVICE's setting. When the power of the DEVICE is turned on, it will be set to the LOCAL ENABLE state.

00.11 : DEVICE TYPE REQUEST

12.11 : DEVICE TYPE RETURN

The "00.11 : DEVICE TYPE REQUEST" command is used for asking the model of the CONTROLLED DEVICE to be connected, and if the CONTROLLED DEVICE receives this command, the "12.11: DEVICE TYPE RETURN" with 2 bytes data will be sent back as a response.

MODEL	DATA-1	DATA-2	
BVU-950 :	1 X	1 C	
BVU-920 :	1 X	1 9	
BVU-900 :	1 X	8 0	
VO-9850 :	1 X	4 C	NTSC, PAL-M models ······X = 0
VO-9800 :	1 X	4 8	PAL model ·················X = 1

10.01 : ACK

When receiving a command from the CONTROLLER, the DEVICE will send back this command as acknowledgement.

11.12 : NAK

When detecting the communication errors or receiving an undefined command, the CONTROLLER will send back this command as not-acknowledgement. Bit-7 to Bit-0 of DATA-1 will be set in accordance with the contents.

DATA-1

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0
TIME OUT	FRAMING ERROR	OVERRUN ERROR	PARITY ERROR		CHECKSUM ERROR		UNDEFINED COMMAND

20.00 : STOP
20.01 : PLAY
20.02 : REC
20.04 : STANDBY OFF
20.05 : STANDBY ON
20.0F : EJECT

When receiving one of the above commands, the DEVICE will be set to the specified mode. The "20.04: STANDBY OFF" command is available only when the CONTROLLED DEVICE is in the STOP mode.

20.10 : FAST FORWARD
20.20 : REWIND

When receiving one of the above commands, the DEVICE will be set to the specified mode.

2X.11 : JOG FWD
2X.12 : VAR FWD
2X.13 : SHUTTLE FWD
2X.21 : JOG REV
2X.22 : VAR REV
2X.23 : SHUTTLE REV

When receiving one of the above commands, the DEVICE will start running in accordance with the speed data defined by the DATA-1 and the DATA-2.
When only DATA-1 is given, X is equal to 1 and the tape speed will be defined as follows.

$$\text{TAPE SPEED} = 10^{(N/32-2)}$$

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)

When setting more precise value than the tape speed defined by DATA-1, DATA-2 will be added, however, the precise value is a linear approximate value (X = 2). When both DATA-1 and DATA-2 are given, the tape speed will be defined as follows.

$$\text{TAPE SPEED} = 10^{(N/32-2)} + N'/256 \{10^{(N-1/32-2)} - 10^{(N/32-2)}\}$$

N : SPEED DATA OF DATA-1 (DECIMAL)
N' : SPEED DATA OF DATA-2 (DECIMAL)

VO-9800/9850, DATA-2 is always used as "0" even if DATA-1 or DATA-2 is given.
The speed error depends on the capability of the DEVICE.

20.30 : PREROLL

When receiving this command, the CONTROLLED DEVICE will be prerolled to the tape position, that is, the value obtained by subtracting the time defined by the "44.31: PREROLL TIME PRESET" command from the IN POINT data equivalent to the timer data or time code stored in the IN ENTRY memory by the "40.10: IN ENTRY" command.

24.31 : CUE UP WITH DATA

The "24.31 : CUE UP WITH DATA" command is used for cueing up the CONTROLLED DEVICE to the position assigned by the time data of DATA-1 to DATA-4.

Units for each type of data are as follows:

DATA-1		DATA-2		DATA-3		DATA-4	
10 Frame	1 Frame	10 Second	1 Second	10 Minute	1 Minute	10 Hour	1 Hour
MSD	LSD	MSD	LSD	MSD	LSD	MSD	LSD

*Refer to Page 25 for MSD of DATA-1 through DATA-4.

20.40 : PREVIEW
20.41 : REVIEW
20.42 : AUTO EDIT

When receiving one of the above commands, the CONTROLLED DEVICE will go into the specified mode.

20.54 : ANTI-CLOG TIMER DISABLE
20.55 : ANTI-CLOG TIMER ENABLE

"20.54: ANTI-CLOG TIMER DISABLE" command prohibits the operation of the ANTI-CLOG TIMER.
"20.55: ANTI-CLOG TIMER ENABLE" command permitted the operation of the ANTI-CLOG TIMER.
When turning on the power, ANTI-CLOG TIMER ENABLE mode is set.

20.60 : FULL EE OFF
20.61 : FULL EE ON

These commands are used for setting or clearing all channels to EE mode.

20.63 : SELECT EE ON

This command is used for setting each EDIT PRESET channel assigned by the DATA-1 of the "41.30: EDIT PRESET" command to the E-E mode.
To clear the SELECT E-E mode, use the "20.64: EDIT OFF" command.

20.64 : EDIT OFF

This command is used for clearing the EDIT mode and also clearing the SELECT EE mode.

20.65 : EDIT ON

This command is used for setting the DEVICE, which is running at the normal PLAY speed during the EDIT PRESET mode, to the EDIT mode.

In VO-9800, this command operates as the DUB command.

44.00 : TIMER-1 PRESET

This command is used for presetting the value, which has been given by the DATA-1 to DATA-4, to the TIMER-1 (CTL COUNTER) of the DEVICE.

DF/NDF mode of TIMER-1 is set corresponding to DATA-1, Bit 6 as the following table.

DATA-1 BIT-6	DF
0	OFF
1	ON

NOTE: NTSC and PAL-M models can set the DF/NDF made.

For the data format, refer to "24.31: CUE UP WITH DATA" command.

44.04 : TIME CODE PRESET

This command is used for presetting the value, which has been given by the DATA-1 to DATA-4, to the TIME CODE of the time code generator.

For the data format, refer to "24.31: CUE UP WITH DATA" command.

The switching of DF/NDF mode of TIME CODE GENERATOR is set corresponding to Bit 6 of DATA-1.

DATA-1 BIT-6	DF
0	OFF
1	ON

NOTE: NTSC and PAL-M models can set the DF/NDF made.

44.05 : U-BIT PRESET

This command is used for presetting the value. which has been given by the DATA-1 to DATA-4, to the USER BIT of the time code generator.

2nd BINARY GROUP	1st BINARY GROUP		4th BINARY GROUP	3rd BINARY GROUP		6th BINARY GROUP	5th BINARY GROUP		8th BINARY GROUP	7th BINARY GROUP
MSD	LSD		MSD	LSD		MSD	LSD		MSD	LSD
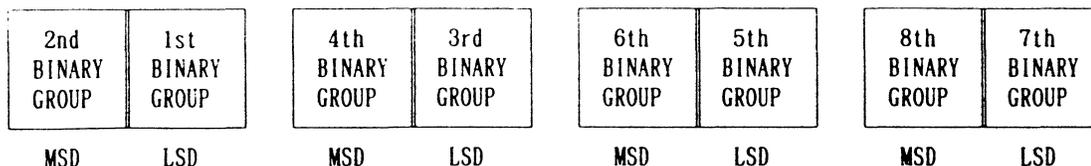
40.08 : TIMER-1 RESET

This command is used for resetting the TIMER-1 (CTL COUNTER) to zero.

20.6A : FREEZE OFF

This command is used for clearing the FREEZE mode.

20.6B : FREEZE ON

When receiving this command. the VTR having a FREEZE function is set to the FREEZE mode in a setting (FRAME or FIELD) on the TBC Remote Controller.

40.10 : IN ENTRY
40.11 : OUT ENTRY

These commands are used for storing the value of the TIMER or the TIME CODE data which is displayed on the DEVICE into the IN or OUT memory as an IN POINT or OUT POINT data.

44.14 : IN PRESET
44.15 : OUT PRESET

These commands are used for presetting the value. which has been given by the DATA-1 to DATA-4, into the IN or OUT memory.

For the data format. refer to the "24.31: CUE UP WITH DATA" command.

40.18 : IN SHIFT +
40.19 : IN SHIFT -

These commands are used for adding or subtracting the value of the TIME DATA. which has been stored as an IN POINT. by one frame.

40.1A : OUT SHIFT +
40.1B : OUT SHIFT -

These commands are used for adding or subtracting the value of the TIME DATA. which has been stored as an OUT POINT. by one frame.

40.20 : IN RESET

40.21 : OUT RESET

These commands are used when turning the IN or OUT status off.

40.24 : IN RECALL

40.25 : OUT RECALL

These commands are used when turning the IN or OUT status to on.

41.30 : EDIT PRESET

Each bit in the DATA-1 is defined as follows.

DATA-1

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0
	INSERT	ASSEMBLE	VIDEO			A 2	A 1

INSERT or ASSEMBLE mode is defined by the Bit-6 and Bit-5. and each channel is defined by the Bit-4 to Bit-0.

44.31 : PREROLL TIME PRESET

This command is used for presetting the preroll time. which has given by the DATA-1 to DATA-4. to the CONTROLLED DEVICE.

For the data format. refer to the "24.31: CUE UP WITH DATA" command.

41.35 : COLOR FRAME SELECT

The color frame mode of the servo system is selected by the state of the DATA-1.

DATA-1

00 : 2 Field

01 : 4 Field

FF : It depends on the setting of the DEVICE.

41.36 : TIMER MODE SELECT

This command is used for selecting the TIMER system used in the AUTO mode which displays the IN ENTRY. OUT ENTRY. IN PRESET. OUT PRESET. PREROLL and CUE UP WITH DATA. etc. by the state of the DATA-1.

DATA-1

01 : TIME CODE

02 : TIMER-1

FF : It depends on the setting of the DEVICE.

41.37 : INPUT CHECK

When the DATA-1 is "01". the VIDEO and AUDIO CH-1/-2 shall be EE mode.

40.40 : AUTO MODE OFF

40.41 : AUTO MODE ON

These commands are used for turning the AUTO mode of the DEVICE on/off.

40.48 : VIDEO REFERENCE DISABLE OFF

40.49 : VIDEO REFERENCE DISABLE ON

When the DEVICE receives "40.49 : VIDEO REFERENCE DISABLE ON". EXTERNAL must be selected as SERVO REFERENCE in the PB and EE mode.

When turning on the power, VIDEO REFERENCE DISABLE OFF is set.

61.0A : TC GEN DATA SENSE

This command is used for requesting the TIME CODE data that the CONTROLLED DEVICE is generating. and the CONTROLLED DEVICE will make a response according to the contents of the DATA-1.

DATA-1

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0
....	....	....	GEN UB	....	....	....	GEN TC

REQUEST COMMAND   RESPONSE COMMAND

DATA-1 = 01:Request for GEN TC ----- "74.08: GEN TIME DATA"

DATA-1 = 10:Request for GEN UB ----- "74.09: GEN UB DATA"

DATA-1 = 11:Request for GEN UB ----- "78.08: GEN TC & UB DATA"

74.08 : GEN TC DATA

When the DEVICE receives the "61.0A: TC GEN DATA SENSE" command and the DATA-1 of this command is "01". the TIME data of the TC which the CONTROLLED DEVICE is generating will be added to the DATA-1 to DATA-4 of the "74.08: GEN TC DATA" and it will be sent back to the CONTROLLING DEVICE.

For the data format. refer to the "24.31: CUE UP WITH DATA" command.

74.09 : GEN UB DATA

When the CONTROLLED DEVICE receives the "61.0A: TC GEN DATA SENSE" command and the DATA-1 of this command is "10", the UB data of TC which the CONTROLLED DEVICE is generating will be added to the DATA-1 to DATA-4 of the "74.09: GEN UB DATA" and it will be sent back to the CONTROLLING DEVICE.

For the data format, refer to the "44.05: U-BIT PRESET" command.

78.08 : GEN TC & UB DATA

When the DEVICE receives the "61.0A: TC GEN DATA SENSE" command and the DATA-1 of this command is "11", the TIME DATA will be added to the DATA-1 to DATA-4 of the "74.08: GEN TIME DATA" command and the user bit data will be added to the DATA-5 to DATA-8, and then they will be sent back.

For the data format, refer to the "24.31: CUE UP WITH DATA" and "44.05:U-BIT PRESET" commands.

61.0C : CURRENT TIME SENSE

This command is used for requesting the TIME DATA or USER BIT, and the CONTROLLED DEVICE will make a response according to the contents of DATA-1.

DATA-1

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0
....	....		LTC UB		TIMER 1		LTC TIME

$$\underbrace{\qquad\qquad}_{M\,S\,D}\qquad\qquad\underbrace{\qquad\qquad}_{L\,S\,D}$$
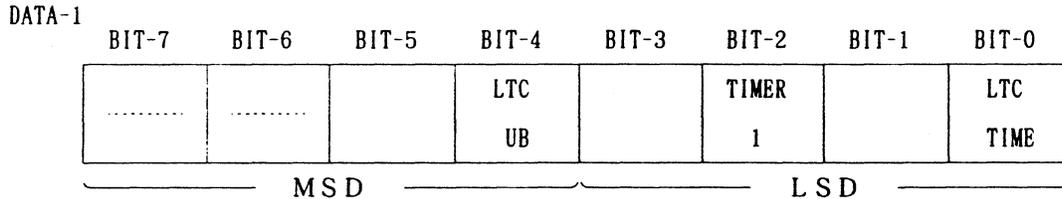
See the following table about the response command according to the request command.

RESPONSE COMMAND \ REQUEST COMMAND DATA-1	01	04	10	*1 11
74.00: TIMER-1 DATA		O		
74.04: LTC TIME DATA	O			
74.05: LTC U-BIT DATA			O	
78.14: LTC INTERPOLATED TIME DATA	O			
78.04: LTC TIME & U-BIT DATA				O
78.14: LTC INTERPOLATED TIME & U-BIT DATA				O

NOTE: *1 The request command DATA-1 = 11 : The response command DATA-1 to DATA-4 return the TIME DATA, and DATA-5 to DATA-8 return the USER BIT DATA.

70. 0D : REQUEST TIME DATA MISSING

When time code is required by the "61.0C: CURRENT TIME SENSE" command and the time code is missing. the "70.0D: REQUEST TIME DATA MISSING" will be sent back.

74. 00 : TIMER-1 DATA

When TIMER-1 data is required by the "61.0C: CURRENT TIME SENSE" command. the TIMER-1 data (CTL COUNTER) will be added to the DATA-1 to DATA-4. At that time. the DF/NDF mode of TIMER-1 is set to the Bit-6 of DATA-1.

For the data format. refer to the "24.31: CUE UP WITH DATA" command.

74. 04 : LTC TIME DATA

When LTC TIME DATA is required by the "61.0C: CURRENT TIME SENSE" command and it is read. the LTC TIME DATA will be added to the DATA-1to DATA-4 and be sent back.

74. 05 : LTC UB DATA

When LTC USER BIT DATA is required by the "61.0C: CURRENT TIME SENSE" command. the LTC USER BIT DATA will be added to the DATA-1 to DATA-4 and be sent back.

For the data format. refer to the "44.05: U-BIT PRESET" command.

74. 14 : LTC INTERPOLATED TIME DATA

When LTC TIME DATA is required by the "61.0C: CURRENT TIME SENSE" command and it interpolates with CTL or it had not read exactly. the LTC TIME DATA will be added to the DATA-1 to DATA-4 and be sent back.

For the data format. refer to the "24.31: CUE UP WITH DATA" command.

78. 04 : LTC TIME & UB DATA

When LTC TIME DATA and USER BIT DATA are required by the "61.0C:CURRENT TIME SENSE" command and it is read. the LTC TIME DATA will be added to the DATA-1 to DATA-4 and the TC USER BIT DATA will be added to the DATA-5 to DATA-8. and then they will be sent back.

For the data format. refer to the "24.31: CUE UP WITH DATA" and "44.05:U-BIT PRESET" commands.

78. 14 : LTC INTERPOLATED TIME & UB DATA

When LTC TIME DATA and USER BIT DATA are required by the "61.0C:CURRENT TIME SENSE" command and it interpolates with CTL or it is not read exactly. the LTC TIME DATA will be added to the DATA-1 to DATA-4 and the LTC USER BIT DATA will be added to the DATA-5 to DATA-8. and then be sent back.

For the data format. refer to the "24.31: CUE UP WITH DATA" or "44.05:U-BIT PRESET" commands.

60.10 : IN DATA SENSE

60.11 : OUT DATA SENSE

These commands are used for requesting the IN/OUT DATA. The CONTROLLED DEVICE will send back a response command according to the command from the CONTROLLING DEVICE.

For the data format of the CONTROLLED DEVICE, refer to the "24.31: CUE UP WITH DATA" command.

```
    REQUEST COMMAND         RESPONSE COMMAND
    IN DATA SENSE: ----- "74.10:IN DATA"
    OUT DATA SENSE:----- "74.11:OUT DATA"
```

74.10 : IN DATA

When the DEVICE receives the "60.10: IN DATA SENSE" command, the data that shows the IN point will be added to the DATA-1 to DATA-4 of the "74.10: IN DATA" and it will be sent back to the CONTROLLING DEVICE.

For the data format, refer to the "24.31: CUE UP WITH DATA" command.

74.11 : OUT DATA

When the DEVICE receives the "60.11: OUT DATA SENSE" command, the data that shows the OUT point will be added to the DATA-1 to DATA-4 of the "74.11: OUT DATA" and it will be sent back to the CONTROLLING DEVICE.

For the data format, refer to the "24.31: CUE UP WITH DATA" command.

60.30 : EDIT PRESET SENSE

This command is used for requesting the status of the EDIT PRESET. The data format of return command "71.30: EDIT PRESET DATA" is equivalent to DATA-5 in the "7X.20 : STATUS DATA ".

60.31 : PREROLL TIME SENSE

This command is used for requesting the PREROLL TIME data. For the data format of return command "74.31: PREROLL TIME DATA", refer to "24.31: CUE UP WITH DATA" command.

60.36 : TIMER MODE SENSE

This command is used for requesting the setting of the TIMER MODE (TIMER-1 or TIME CODE) of the DEVICE.

When the DEVICE receives this command, it will send back the "71.36: TIMER MODE STATUS" with DATA-1 that shows the switch setting.

```
 "71.36: TIMER MODE STATUS" DATA-1:  00 ----- TIME CODE
                                     01 ----- TIMER-1
```

71.36 : TIMER MODE STATUS

Refer to the "60.36: TIMER MODE SENSE" command.

61.20 : STATUS SENSE

This command is used for requesting the status of the CONTROLLED DEVICE, and the CONTROLLED DEVICE will send back a response command according to the contents of the DATA-1 of the CONTROLLING DEVICE.

DATA-1

BIT-7	BIT-6	BIT-5	BIT-4	BIT-3	BIT-2	BIT-1	BIT-0

⌞————— M S D —————⌟ ⌞————— L S D —————⌟

MSD(Bit-7 to 4): Indicates the initial Data No. of the "7X.20: STATUS DATA" to be sent back.

LSD(Bit-3 to 0): Indicates the number of data bytes in "7X.20: STATUS DATA" to be sent back.

EX. When the DATA-1 of the "61.20: STATUS SENSE" command is 2A.
The CONTROLLED DEVICE will send back ten bytes from the DATA No. 2, i.e.
DATA No. 2 to DATA No. B, of the "7X.20: STATUS DATA".

7X.20: STATUS DATA(BVU-900/920/950 and VO-9800/9850)

DATA \ BIT	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
DATA 0			CASSETTE OUT		TAPE TROUBLE	HARD ERROR		LOCAL
DATA 1	STANDBY ON		STOP	EJECT	REW	F. FWD	REC *1	PLAY
DATA 2	SERVO LOCK		SHUTTLE	JOG	VAR	REV ——— FWD	STILL	CUEUP COMPLETE
DATA 3	AUTO MODE						OUT	IN
DATA 4	SELECT EE ON *1	FULL EE ON *1	FREEZE ON *2	EDIT *1	REVIEW *1	AUTO EDIT *1	PREVIEW	PREROLL OR CUEUP
DATA 5		INSERT *1	ASSEMBLE *1	VIDEO *1			AUDIO CH-2 *1	AUDIO CH-1 *1
DATA 6								
DATA 7								IN~OUT STATUS
DATA 8				END OF TAPE	COLOR FRAME LOCK			REC INHIBIT *3
DATA 9								
DATA F								

NOTE *1) Player(BVU-900/920) don't set this bit.
   *2) BVU-900/920/950 set this bit in the FREEZE mode.
   *3) Player(BVU-900/920) always set this bit.

DATA No. 0

DATA No. 0/BIT-5 : CASSETTE OUT

Bit-5 will be set to "1" when there is no cassette threading on the CONTROLLED DEVICE.

DATA No. 0/BIT-3 : TAPE TROUBLE

Bit-3 will be set to "1" when the trouble occurs (the tape is sticking to the drum, the tape is slacking, etc.).

DATA No. 0/BIT-2 : HARD ERROR

Bit-2 will be set to "1" when trouble occurs (the tape is sticking to the drum, the tape is slacking, etc.).

DATA No. 0/BIT-0 : LOCAL

Bit-0 will be set to "1" when the REMOTE/LOCAL switch on the front panel is set to "LOCAL".

DATA No. 1

DATA No. 1/BIT-7 : STANDBY ON

Bit-7 will be set to "1" when the DEVICE is in the STANDBY ON mode.

DATA No. 1/BIT-5 : STOP

Bit-5 will be set to "1" when the DEVICE receives the "20.00: STOP" command and goes into the STOP mode.

DATA NO. 1/BIT-4 : EJECT

Bit-4 will be set to "1" when the DEVICE receives the "20.0F: EJECT" command and goes into the EJECT mode.

DATA No. 1/BIT-3 : REW

Bit-3 will be set to "1" when the DEVICE receives the "20.20: REWIND" command and goes into the REWIND mode.

DATA No. 1/BIT-2 : F. FWD

Bit-2 will be set to "1" when the DEVICE receives the "20.10: FAST FORWARD" command and goes into the FULL FORWARD mode.

DATA No. 1/BIT-1 : REC

Bit-1 will be set to "1" when the DEVICE receives the "20.02: REC" command and goes into the REC mode.
Bit-1 will be also set to "1" when "DATA No.4/Bit-4 EDIT" is set to "1".

DATA No. 1/BIT-0 : PLAY

Bit-0 will be set to "1" when the DEVICE receives the "20.01: PLAY", "20.02:REC" or "20.65: EDIT ON" command and goes into the PLAY, REC or EDIT mode.

DATA No. 2

DATA No. 2/BIT-7 : SERVO LOCK

Bit-7 will be set to "1" when the DEVICE is in the condition that the drum and the capstan servos are locked in the PLAY mode.

DATA No. 2/BIT-5 : SHUTTLE

Bit-5 will be set to "1" when the DEVICE receives the "2X.13: SHUTTLE FWD" and "2X.23: SHUTTLE REV", and goes into the SHUTTLE mode.

DATA No. 2/BIT-4 : JOG

Bit-4 will be set to "1" when the DEVICE receives the "2X.11: JOG FWD" or "2X.21: JOG REV" command and goes into the JOG mode.

DATA No. 2/BIT-3 : VAR

Bit-3 will be set to "1" when the CONTROLLED DEVICE is in the following mode.
• VAR mode("2X.12: VAR FWD" or "2X.22: VAR REV" command is received.).

DATA No. 2/BIT-2 : TAPE DIRECTION

Bit-2 shows the tape direction defined for the DEVICE.

  0 = FWD

  1 = REV

DATA No. 2/BIT-1 : STILL

Bit-1 will be set to "1" when the DEVICE is in STOP mode or STILL mode of SHUTTLE/JOG/VAR.

DATA No. 2/BIT-0 : CUE UP

Bit-0 will be set to "1" when the DEVICE receives "20.30": PREROLL and "24.31: CUE UP WITH DATA" commands and then cue-up operation is completed.

DATA No. 3

DATA No. 3/BIT-7 : AUTO MODE

Bit-7 will be set to "1" when the DEVICE receives the "40.41: AUTO MODE ON" command.

DATA No. 3/BIT-1 : OUT

DATA No. 3/BIT-0 : IN

When the DEVICE receives ENTRY, PRESET and RECALL commands of each editing point (IN or OUT), the corresponded bit will be set to "1", and TIMER-1 or TIME CODE data is memorized.

DATA No. 4

DATA No. 4/BIT-7 : SELECT EE ON
Bit-7 will be set to "1" when the DEVICE receives the "41.30: EDIT PRESET" command, and furthermore, receives the "20.63: SELECT EE ON" command.

DATA No. 4/BIT-6 : FULL EE ON
Bit-6 will be set to "1" when the DEVICE receives the "20.61: FULL EE ON" command.

DATA No. 4/BIT-5 :FREEZE ON
Bit-5 will be set to "1" when the DEVICE receives "20.68: FREEZE ON" command and goes into the FREEZE mode. Bit-5 will be automatically reset to "0" when the VTR mode is changed or the device receives "20.6A:FREEZE OFF" command.

DATA No. 4/BIT-4 : EDIT
Bit-4 will be set to "1" when the CONTROLLED DEVICE is in the EDIT mode, and at the same time, the "DATA No. 1/BIT-1:REC" is also set to "1".

DATA No. 4/BIT-3 : REVIEW
Bit-3 will be set to "1" when the CONTROLLED DEVICE is in the REVIEW mode.

DATA No. 4/BIT-2 : AUTO EDIT
Bit-2 will be set to "1" when the CONTROLLED DEVICE is in the AUTO EDIT mode.

DATA No. 4/BIT-1 : PREVIEW
Bit-1 will be set to "1" when the CONTROLLED DEVICE is in the PREVIEW mode.

DATA No. 4/BIT-0 : PREROLL or CUE UP
Bit-0 will be set to "1" when the CONTROLLED DEVICE receives the "20.30:PREROLL" and "24.31: CUE UP WITH DATA" commands, and goes into the PREROLL and CUE-UP modes, and Bit-0 will be also set to "1" during PREROLL in the AUTO EDIT or PREVIEW modes.

<u>DATA No. 5</u>

DATA No. 5/BIT-6 : INSERT
DATA No. 5/BIT-5 : ASSEMBLE
DATA No. 5/BIT-4 : VIDEO
DATA No. 5/BIT-1 : AUDIO CH-2
DATA No. 5/BIT-0 : AUDIO CH-1
When the CONTROLLED DEVICE receives the "41.30: EDIT PRESET" command. the corresponding bit of
DATA No.5 will be set to "1" according to the state of the DATA-1 of the EDIT PRESET command.

<u>DATA No. 7</u>

DATA No. 7/BIT-0 : IN-OUT STATUS
Bit-0 will be set to "1" when the DEVICE is in the PREVIEW or AUTO EDIT mode and the tape is
running between the IN point and OUT point.

<u>DATA No. 8</u>

DATA No. 8/BIT-4 : END OF TAPE
Bit-4 will be set to "1" when the DEVICE detects BEGIN or END of the cassette tape.

DATA No. 8/BIT-3 : COLOR FRAME LOCK
Bit-3 will be set to "1" when the DEVICE goes into the PLAY. REC or EDIT mode and the color
framing is locked.

DATA No. 8/BIT-0 : REC INHIBIT
Bit-0 will be set to "1" when the record is inhibited by the miss-recording prevention red cap
on the cassette tape.

TIME DATA FORMAT

The TIME DATA FORMAT used in this manual is as follows:
DATA 1 BIT 6: DF FLAG ("1"DF, "0" NDF)
             .. applicable only for NTSC and PAL-M models
This bit is set according to DF/NDF mode of the DEVICE when responding to the time data
request command from the CONTROLLER (i.e. "61.0C: CURRENTTIME SENSE").
It is also utilized for setting the DF/NDF mode of the DEVICE. (i.e. "44.04:TIME CODE PRESET").

The bits shown in the shaded part in the above table are insignificant as time data. The logic
level of these bits are undefined.

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