

# < TASCAM 15 pin Serial interface specification > mit 134

## 1. Applied range

This standards use to communicate control information and/or status information between TASCAM models and computers, etc.. This standards prescribe interface to use 15 Pin connector.

This interface is included two circuit within same connector. One is communication circuit which is serial transmitted binary-data be based on RS-232C. Other is controlling circuit which is transmitted controlling signal and/or timing signal to controlled device. This standards defines only communication circuit.

## 2. Meaning of each words

- < Device >: TASCAM models which are followed this standards.
- < Controlled side >: Devices which are controlled generally in this standards.  
A lot TASCAM models(Multi-track-recorder and Compact-disc-player, etc.) apply to these devices. These device will operate to receive "Command". Also, these device will answer "Status" by receiving "Status-request".
- < Controlling side >: Devices which are controlling generally in this standards.  
Normally, computers(programmable devices, etc.) apply to these devices. Synchronizer on TASCAM models will operate as controlling-side on MTR relation.
- < Message >: It means words strings. This has "Terminator" as end of message.
- < Command >: It means command which transmit from controlling side to controlled side.
- < Status request >: Controlling side has to send response requiring message for sensing condition on Controlled side. It maeans this response requiring message.
- < Status >: It means response message which returns back from controlled side to controlling side against < Status request >.
- < Header >: It means one ward which is set on beginning of message.  
Header shows a kind of this meessage.
- < Terminator >: It means word-string which is set on end of message.  
C/R L/F are used to this standard.

## 3. Connector

This standards is used to "D-SUB 15 Pin". Also, shape, demention and pin assignment No. of this connector is defined by "JIS-X5102". In principle, naming of this interface is called "**ACCESSORY 2 (SERIAL I/F)**" on panel of each devices.

#### 4. Pin assignment

Pin assignment is like below table.

Pin #	IN/OUT	略号	Signal name (Communication circuit)
1	-----	FG	Frame-ground, Shield
2	OUT	SD	Send data (TD)
3	*		
4	IN	RD	Receive data
5	*		
6	*		
7	*		
8	-----	SG	Signal-ground, Common-return
9	*		
10	*		
11	*		
12	*		
13	*		
14	*		
15	*		

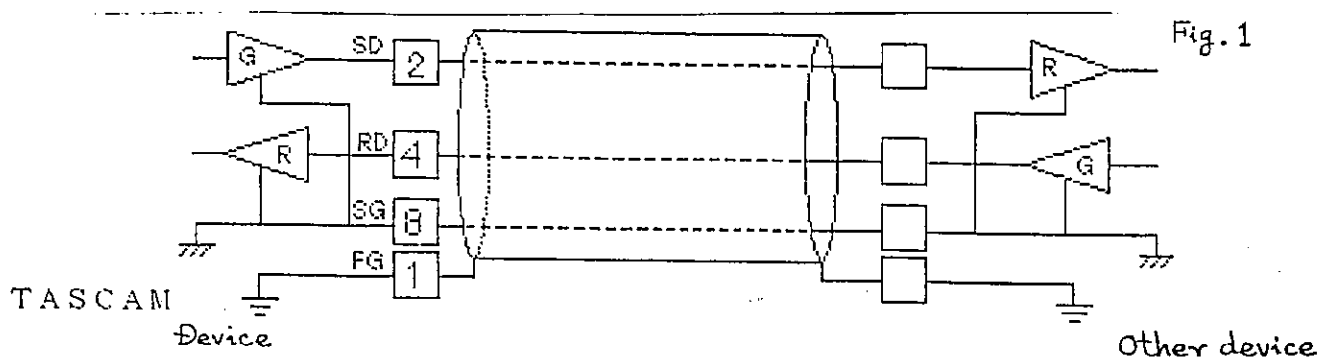
Note1. FG: In internal device, this pin is connected to chassis electrically as frame-ground.

2. SD: This pin is always used as sending output pin. ( Sometimes called TD. Send date = Transmit data )
3. RD: This pin is always used as receiving input pin.
4. SG: This line is given as Standard DC potential voltage. This is connected with signal ground on internal device.
5. \* : These pins are used to controlling circuit. Or, these pins are used for extending in future. Function of these pins are different depend on devices including in and output.

#### 5. Interface specification

##### 5-1 Mutual connection circuit

Show mutual connection circuit between device and other device as below.



5-2 Electrical specification  
 Conform standardization  
 Impedance on Receiver side

JIS X-5101 (Old JIS C-6361, EIA RS-232C)  
 Measurement condition is  $\pm 3$  through  $\pm 15$  volts.

D.C. resistance is between 3k and 7kohms  
 Total effective load capacitor is less than 2500pF.

Less than 25volts.

Open circuit voltage  
 on Transmitter side  
 Open circuit voltage  
 on Receiver side  
 Signal voltage

Less than 2volts.

If open circuit voltage on receiver side is 0volt, it's from  $\pm 5$ volts to  $\pm 15$ volts against load resistor of 3k to 7kohms.

Signal discrimination  
 Logical "1"  
 Logical "0"

Less than -3volts.

Less than +3volts.

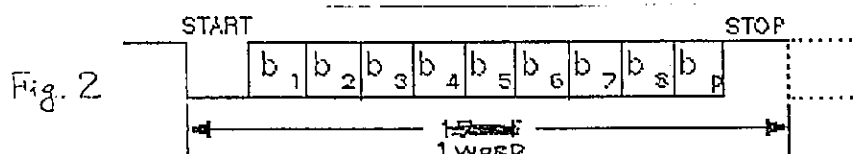
### 5-3 Communication specification

Communication style  
 Communication form  
 Synchronization method  
 Baud-rate

3 wired, Half-duplex  
 Digital binary serial transmission  
 Asynchronous  
 1200 / 2400 / 4800 / 9600 b.p.s.

Word construction

Start bit (1 unit length)  
 + Data bit (8 units length)  
 + Parity bit (1 unit length)  
 + Stop bit (1 unit length)  
 Totally 11 bit  
 (1 unit length = 1/Data signal speed)



Data bit

MSB is always "0". Least 7 bits is assigned 7 unit code(ASCII). Transmission order of information is from LSB( $b_1$ ) to MSB( $b_8$ ).

Parity bit

Even parity. When device will send message, correct parity is added as following this standard. When device will receive message, parity-check is executed. In case of detecting error, the treatment is decided depend on devices.

At intervals of each words

Interval from Stop bit on this word to Start bit on next word is more than "0" freely. Also, signal polarity has to keep as same condition as Stop bit.

But sometimes we have to prepare limitation this timing depend on devices(Time-out detection).

## 6. Message regulations

### 6-1 Message format

Format of each message are separate below 4 kinds.

1. Form 1: Header ( + Terminator )  
Command(message) content is decided only "Header".
2. Form 2: Header+Sub. header ( + Terminator )  
Extended command is shown by "Sub. header".
3. Form 3: Header+Parameter ( + Terminator )  
Parameter appoints concrete value and content.
4. Form 4: Header+Sub.header+Parameter ( + Terminator )

### 6-2 Notation of Syntax

In this standardization, I will use below notation from now regarding to describe for Format (Syntax) of message.

#### 1. Circle

Example	(A)	ASCII word "A"	41H
	(C/R)	Carriage-Return	0DH
	(L/F)	Line-Feed	0AH

#### 2. Squared one is Header or expression of parameter portion. This adapts for one ASCII character.

- a) HDR means Header. Also, SUB means Sub-header.
- b) n means Hex-decimal code.  
: Any one word in 10 kinds decimal number "0,1,.....,9"  
as expressing 30H~39H is shown.  
Any digits decimal number is shown by repeating "n".  
In principle, beginning number can not be permitted  
number "0".
- c) T means Hex-decimal code.  
: Any one word in 16 kinds ASCII words " 0,1,.....,9,;  
:,<,>,<,>," as expressing 30H~3FH is shown.  
Last 4 digits on T is used.  
T is used to assign independent ON/OFF setting condition  
at each 4 channels on MTR.  
Any combination can be assigned by repeating " T ".

#### 3. In order to show sentence structure, each items are connected by line attached arrow mark. This can flow only arrow direction. If you find divergence, you omissible option. Like this case, you can choice both way. When sentence structure is shortened, suitable default value will be applied.

#### 4. If you find return-route, you can repeat proper times. But, sometimes this repetition has some limitation depend on devices.

#### 5. Vertical line on right hand side means end of message.

Note)

General principle of this standard is shown in below message rules and syntax expressions. Depend on individual devices, part of message (Command, Status) and/or part of sentence structure are not supported. Like this case, only defined command and format are permitted.

Meaning of each message (Semantics) has a few difference depend on devices, too. Regarding to this, please care about note on each items, item of implementation and each manuals.

" O " means that this device has this function.

" \_ " means that this device dose not have this function.

Also, " ~ n " means error code number (Please refer to 8-2-10).

### 6-3 Handling for Message

1. Proper length command buffer should be prepared in order to receive command and at Controlled-side. When plural commands are given (even if one word message), device will recognize and execute until confirming termination word (= C/R) [except Command group 1a, refer to page 6].
2. Controlling-side device can send word " L/F " as termination to continue " C/R ". Controlled-side device ignores usually this " L/F ". In case of Command group 1a, handling for " C/R " and " LF " will send to combine together.
3. Time limitation (= Time out) dose not difine during 1 message of command or status request in particular.  
Duty which sends command has Controlling-side. Controlled-side can be allowed to wait terminator intently.
4. In case of receiving " Status-request ", Controlled-side will sense newest status at this moment then response quickly. Timing duration from ending receive terminator of request to starting response status is less than 100 msecond. Also, timing duration from receving illegal command to answering error message is less than 100 msecond. Ward interval of status response is less than 100 msecond.
5. Automatic " Hand-shake (like ACK/NAK, etc) " dose not exute in standard controlling procedure on this standards. So, Controlling-side must continue to comfirm each status from Controlled-side.  
Therefore, minimum interval between one command and next command has unavoidable limitation. But, this standard dose not define this matter. Interval between completion of sending one command and beginning of next status request is more than 10 msecond. Also, interval between completion of one status response and beginning of next command (status request) sending is more than 10 msecond. (Refer to figure-3)
6. Any kind error can be caused by communication error and syntax error, etc.. Depend on devices, if error is detected including operation mistake, Controlled-side sometimes transmit error message without requesting from Controlling-side.

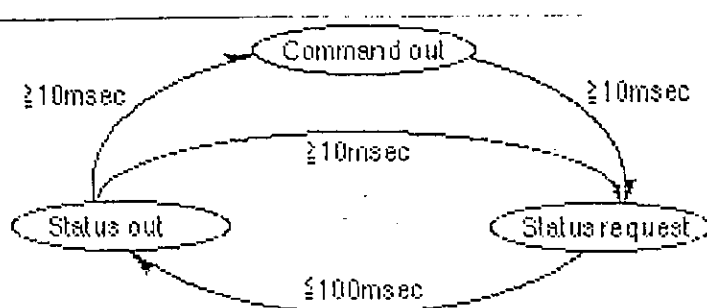
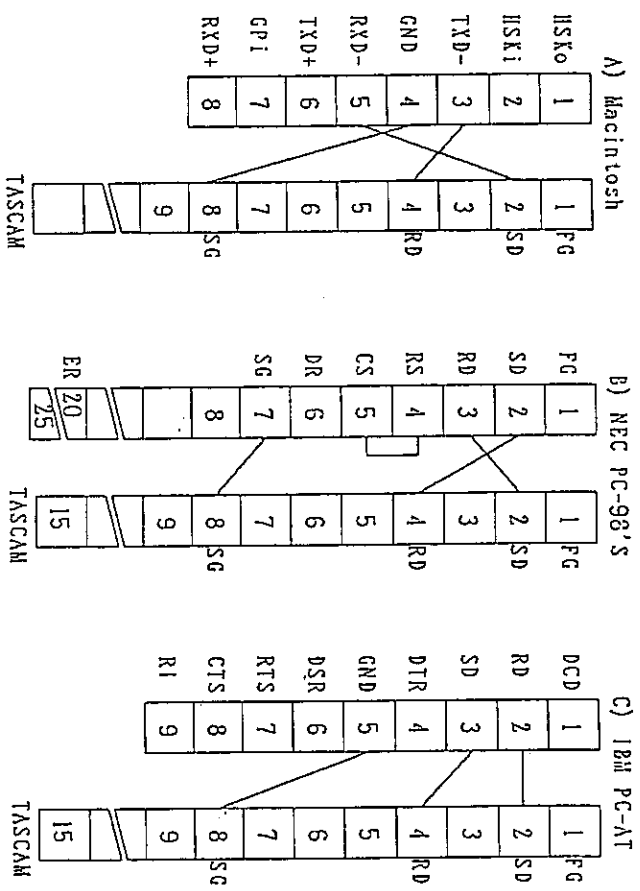


Fig. 3

# 9-2: 接続例 Connection Example.



# < Specification for CD player/Controller (Tentative) >

Issued Date: APR. '92.

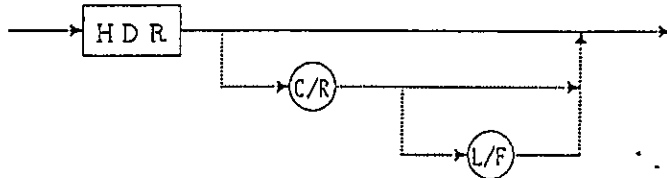
## 7. Command

### 7-1: Command group 1

This group executes to control transport and takes "Form 1".

< Type 1a >

In order to get quick response when "Header" comes, command will sometimes execute without "terminator".



HDR		Command	Implementation		
Hex	ASCII		RC-701	RC-601	CD-601
50	P	Play/Online Play	○	○	○
53	S	Stop	○	○	○
55	U	Set	○	— ~4	— ~4
58	X	Ready	○	○	○
5B	[	Check Memory	○	— ~4	— ~4
5C	¥ or \	Repeat	○	○	— ~4
5D	]	Monitor Play	○	○	○
5E	^	Monitor Pause	○	○	○

134 Q  
zusätzl. R

FF  
REW

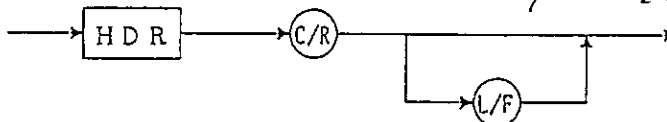
v Rec Play  
w Rec Out

Z RTZ

< Type 1b >

This structure takes "Form 1".

x Pause  
y Rec Pause



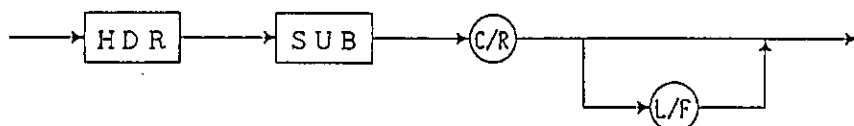
HDR		Command	Implementation		
Hex	ASCII		RC-701	RC-601	CD-601
66	f	Auto Cue	○	○	○
67	g	Single	○	○	○
68	h	PGM/Memo Mode	○	○	— ~4
69	i	Search Fast	○	— ~4	— ~4
6A	j	Pitch	○	○	○
6B	k	Index	○	— ~4	— ~4
6C	l	Clear	○	— ~4	— ~4
6D	m	Skip Forward	○	— ~4	— ~4
6E	n	Skip Reverse	○	— ~4	— ~4
6F	o	PGM Mode	— ~4	○	— ~4



## 7-2: Command group 2

This group takes "Form 2".

< Type 2 >

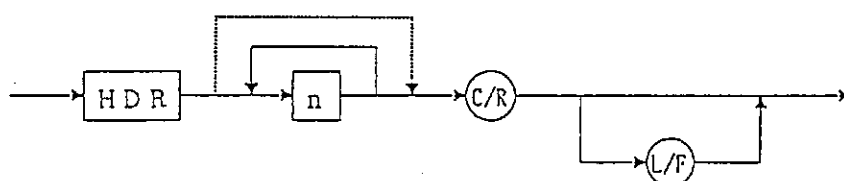


HDR		SUB		Command	Implementation		
Hex	ASCII	Hex	ASCII		RC-701	RC-601	CD-601
4F	O	38	8	Display Change 1	○	○	○
		39	9	Display Change 2	○	— ~4	— ~4

## 7-3: Command group 3

This group takes "Form 3".

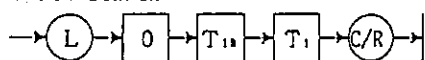
< Type 3a >



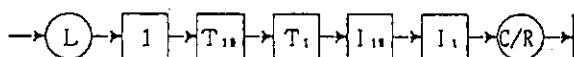
3-a

HDR		SUB		Command	Implementation		
Hex	ASCII	Hex	ASCII		RC-701	RC-601	CD-601
4C	L	30	0	Track Seek	○	○	○
		31	1	Index Seek	○	○	○
		32	2	Time Seek	○	○	○
4D	M			Unit Select	○	— ~4	— ~4

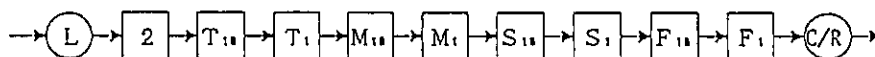
Track Search



Index Search



Time Search



T : Track No

I : Index No

M : Minute

S : Second

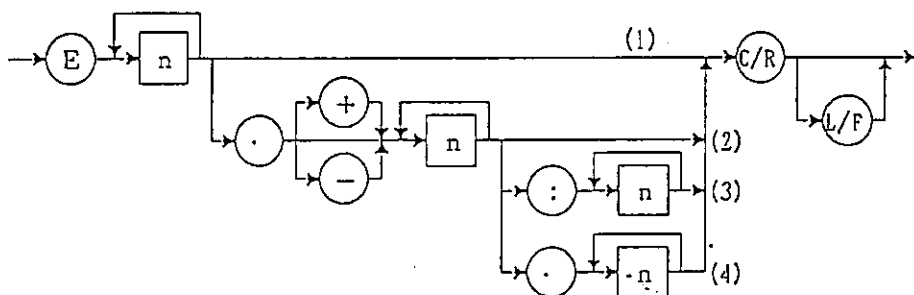
F : Frame

11 : 10の位

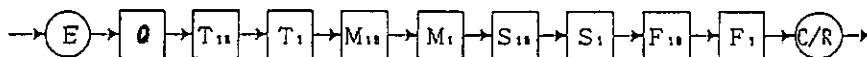
1 : 1の位

< Type 3b >

This group takes "Form 3" with extension Form. Operating objects are decided by plural "Parameters".



HDR		Command	Implementation		
Hex	ASCII		RC-701	RC-601	CD-601
45	E	Cue Point Set	—~4	○	○

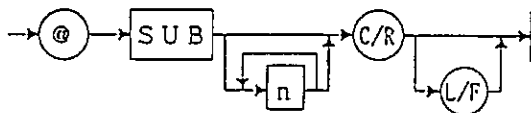


Cue Point:

Player automatically goes into READY mode when the pickup comes to this point in ON LINE PLAY mode. (Status flag is not reset.)

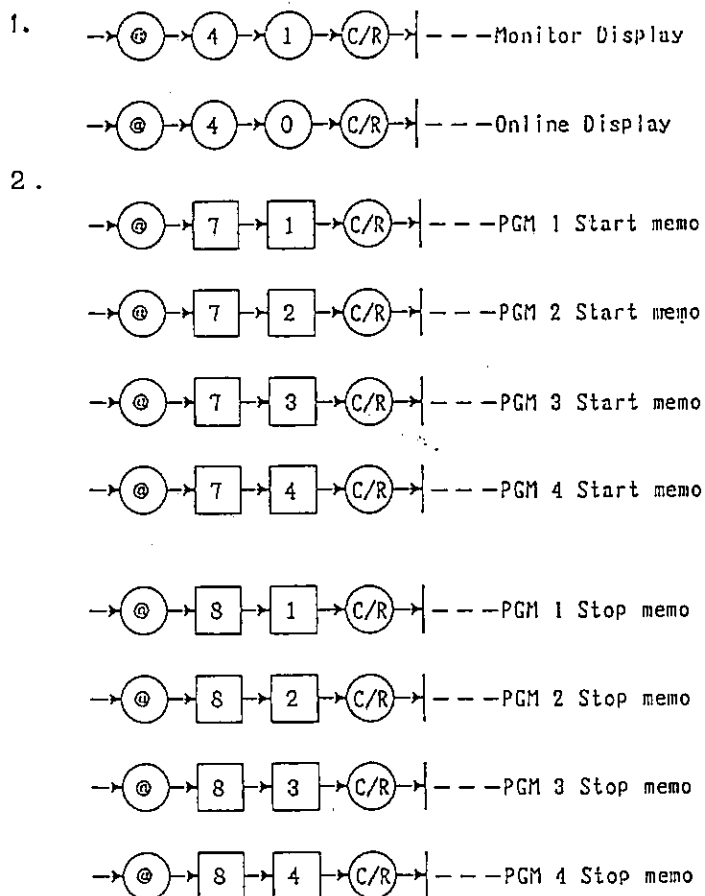
## 8. Status

### 8-1: Status-Request



HDR		SUB		Status Requested	Implementation		
Hex	ASCII	Hex	ASCII		RC-701	RC-601	CD-601
40	@	34	4	Counter Number	○	○	○
		37	7	Memo1/Cue1	○	○	○
		38	8	Memo2/Cue2	○	—~4	—~4
		3B	;	ID	○	○	○
		3C	<	Status 1 (bit)	○	○	○
		3D	=	Status 2 (bit)	○	—~4	—~4
		3F	?	Pitch	○	○	○

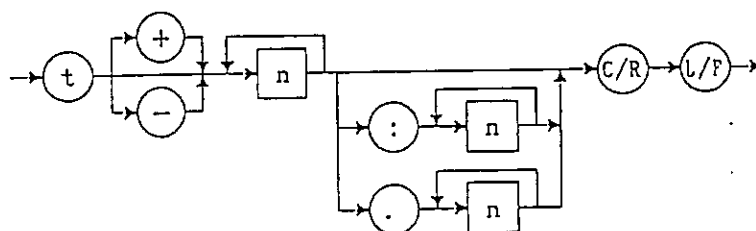
#### (RC-701)



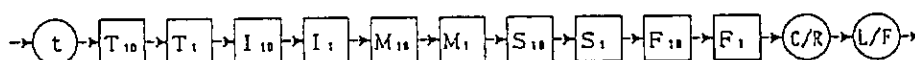
## 8-2: Status-Response

HDR		Status Response	Implementation		
Hex	ASCII		RC-701	RC-601	CD-601
74	t	Counter Number	○	○	○
77	w	Memo 1/Cue 1	○	○	○
78	x	Memo 2/Cue 2	○	~4	~4
7C		Status 1 (bit)	○	○	○
7D	}	Status 2 (bit)	○	~4	~4
7E		Error	○	○	○
7F	DEL	Pitch	○	○	○

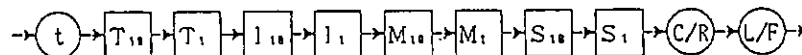
### 8-2-1: Counter Number Status



( Request Command " @40 " )

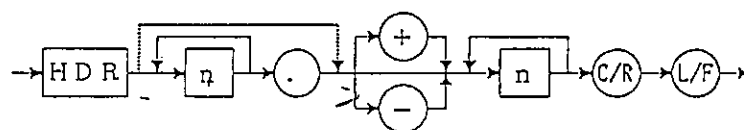


( Request Command " @41 " )

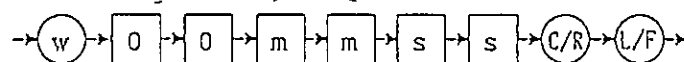


### 8-2-2: Cue 1 Memory Status

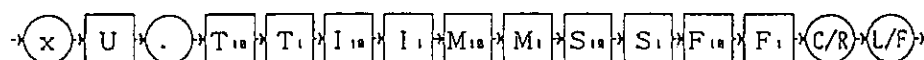
### 8-2-3: Cue 2 Memory Status



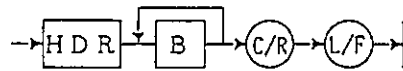
( RC-601 / CD-601 )



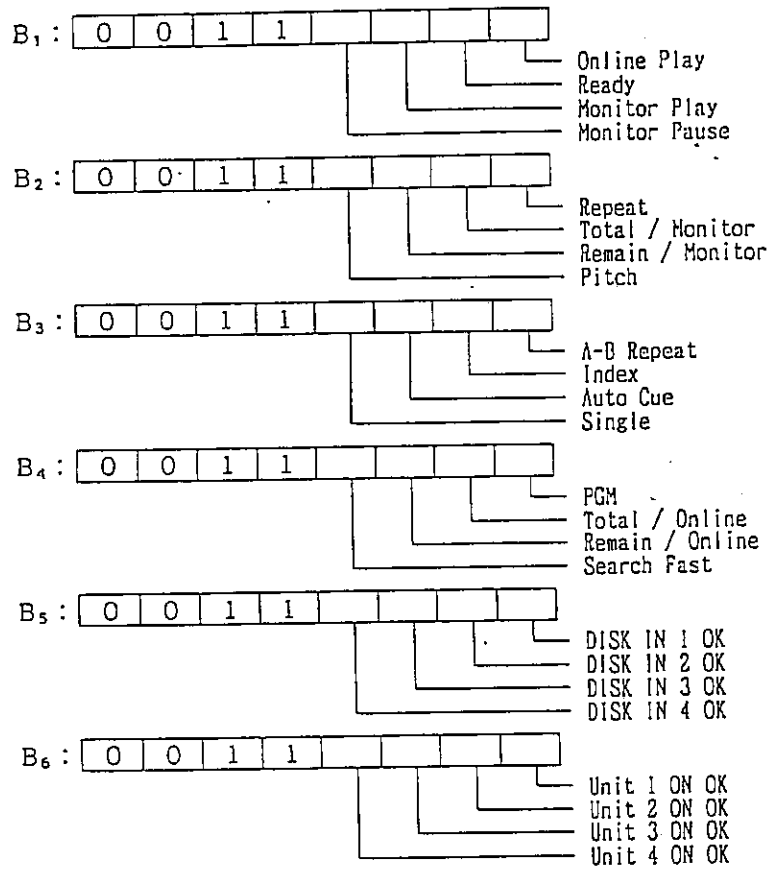
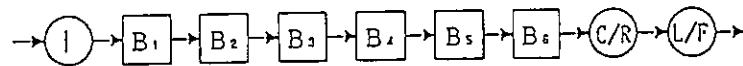
( RC-701 )



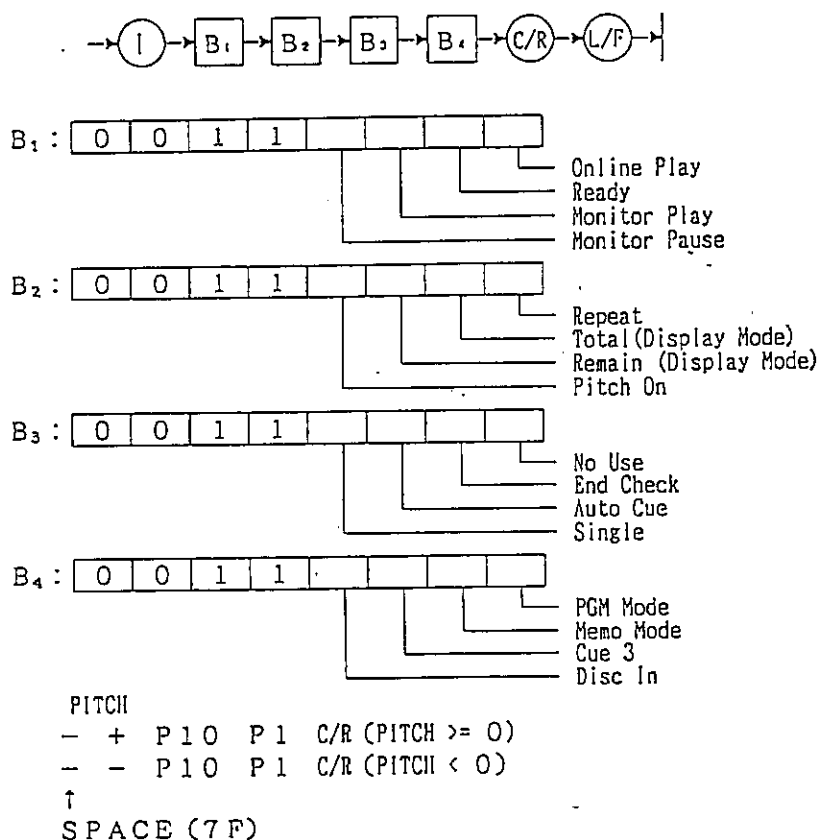
# 8-2-4: Status 1, 2



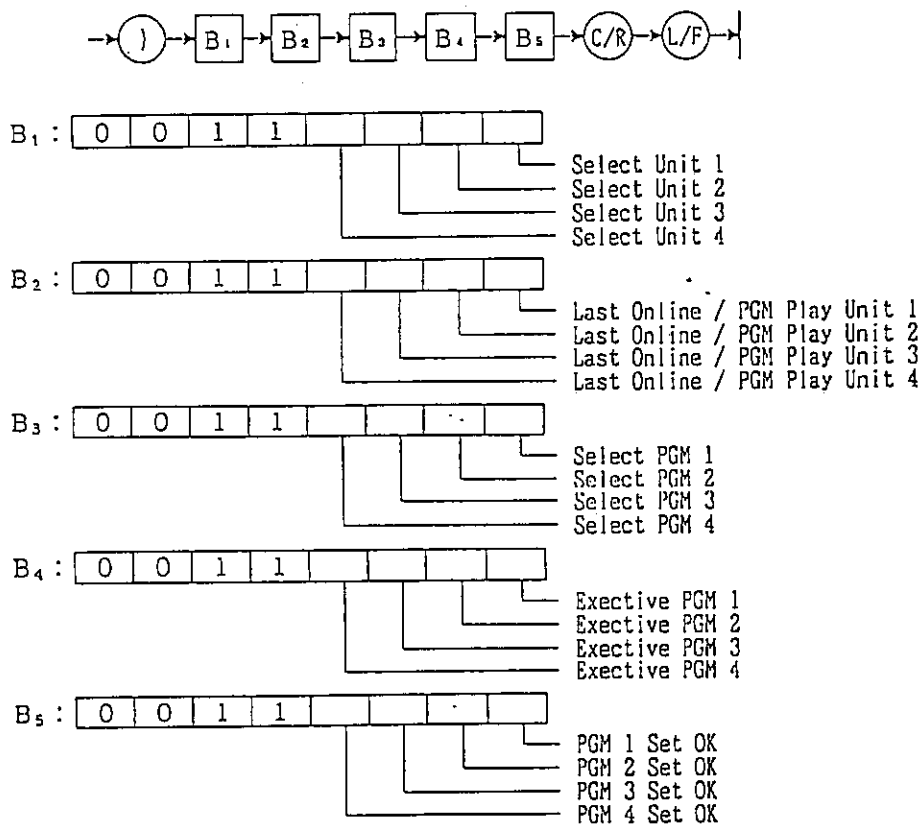
( STATUS 1 , RC-701 )



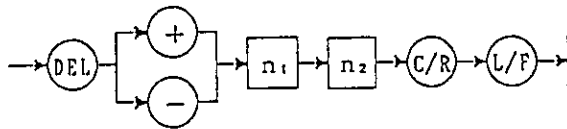
# ( STATUS 1. RC-601/CD-601 )



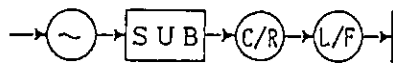
## ( STATUS 2 )



### 8-2-5: Pitch Status



### 8-2-6: Error Status



HDR		SUB		Error	Implementation		
Hex	ASCII	Hex	ASCII		RC-701	RC-601	CD-601
7E		30	0	Parity Check Error	○	○	○
		31	1	Over Run Error	○	○	○
		32	2	Framing Error	○	○	○
		34	4	Undefined Message	○	○	○
		35	5	Syntax er./Illegal Msg	○	○	○
		36	6	Inoperable Mode	○	○	○
		37	7	No Medium	○	—	—