

General Rules for Uses of Frequency and Code for Infrared Remote Control Units

1. Scope This VIS prescribes general rules for uses of frequency and code of transmitters and receivers for their infrared remote control units (16 bits/word) manufactured and sold by JVC. However, this standard is not applicable to transmitters and receivers whose specifications are controlled by special requirements by the clients of OEM products or laws and regulations of a country where products are to be sold.

This VIS is intended to avoid the interference among various kinds of products by standardizing the frequency and code of transmitters and receivers for their infrared remote control units, to make the systemization easier, and to maintain the consistency defined by JVC.

Remote control units having the format defined by Association for Electric Home Appliances shall conform to **VIS H 1402** (General Rules for Uses of Frequency and Code for AEHA Format Infrared Remote Control Units).

2. Definitions of terms

- a) **Maker code** A code allocated to each maker (manufacturer).
- b) **Equipment code** A code allocated to each equipment.
- c) **Function & operation code** A code (8 bits) allocated to actual operation of the equipment.
- d) **Custom code** A code to identify the company that supplies the products. Normally, this custom code is composed of a maker code and an equipment code.

3. Standard

3.1 Wavelength of infrared light The central wavelength of infrared light shall be 940 nm.

3.2 Frequency of carrier The frequency of carrier shall be 37.9 kHz.

3.3 Transmission format The transmission format is shown in **Table 1** and **Figs. 1 - 4**.

Table 1 Transmission format

Item	Content
1. Type of modulation	Pulse-interval modulation
2. Header	Mark 8.44 ms, space 4.22 ms (omissible) ⁽¹⁾
3. Pulse width	0.527 ms \pm 60 μ s
4. Pulse interval (0)	1.055 ms \pm 60 μ s
5. Pulse interval (1)	2.11 ms \pm 100 μ s
6. Output form	Word-unit continuous output
7. Word cycle	46.42 ms \pm 2 ms
8. Space between words	(46.42-16.88-0.527-n \times 1.055) \pm 2 ms: n is the number of "1".

Remarks: A header is outputted only when transmission is started to stabilize the receiving circuit.

Note (1) In principle, it is desirable to add this although it can be omitted if necessary.

Remarks: A header is outputted only when transmission is started to stabilize the receiving circuit.

Note (1) In principle, it is desirable to add this although it can be omitted if necessary.

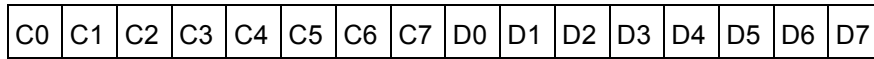


Fig. 1 Code form

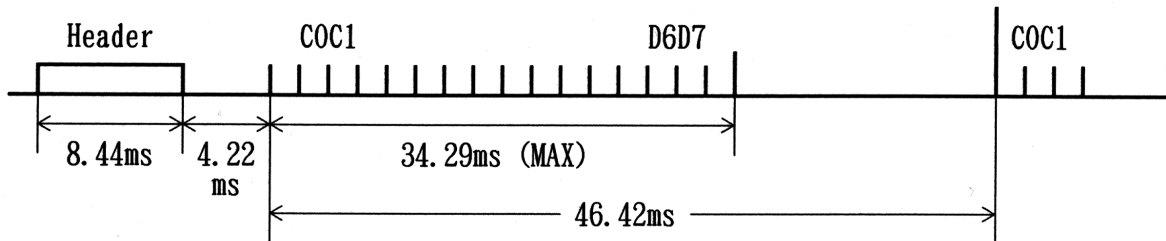


Fig. 2 Wave form of output

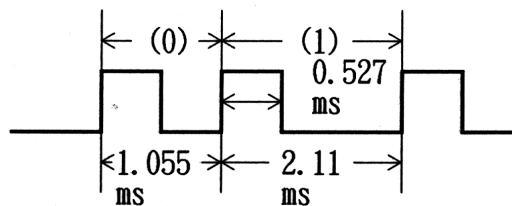


Fig. 3 Pulse width and pulse interval

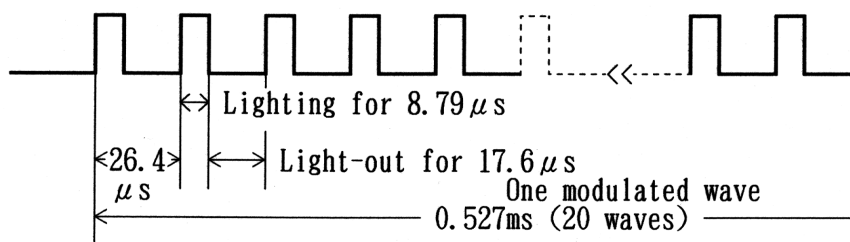
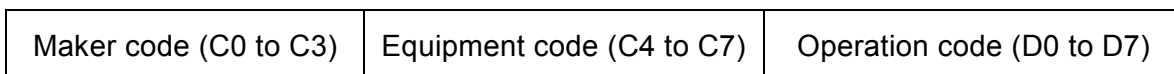


Fig. 4 Wave form of carrier

Remark: A carrier frequency of 37.9 kHz with a duty ratio of 1/3 is used as the standard.

3.4 Transmission and reception codes

1) **The bits** The bits for transmission and reception codes are 16 bits comprised of maker code, equipment code and function & operation code.



2) **Maker code (C0 to C3)** JVC's maker code shall be "1100" or "1111".

- 3) **Equipment code (C4 to C7)** The allocation of the equipment code shall be decided according to **Table 2**.

Table 2 Allocation of the equipment code

Custom code (Maker code + equipment cod					Equipment	Division				
C7	C4	C3	C0	Hexa- decimal						
0	0	0	0	0	3	TV	(AVMDP) Former (Television Div.)			
0	0	0	1	1	1	3		VHD		
0	0	1	0	1	1	2		3	Teletext	
0	0	1	1	1	1	3		3		
0	1	0	0	1	1	4	3	VHS (A)	(AVMHS)Digital Video Storage Category Former (Video Div.)	
0	1	0	1	1	1	5	3	VHS (B)		
0	1	1	0	1	1	6	3	Projector	(ILA center)	
0	1	1	1	1	1	7	3	Projector	(ILA center)	
1	0	0	0	1	1	8	3	Tape deck	(AVMAV) Former (Audio Div.)	
1	0	0	1	1	1	9	3	DAT		
1	0	1	0	1	1	A	3	Amplifier, tuner		
1	0	1	1	1	1	B	3	CD/player		
1	1	0	0	1	1	C	3	Karaoke equipment, etc.	Professional Systems Company	
1	1	0	1	1	1	D	3	Movie	(AVMCAM) Former (Video Div.)	
1	1	1	0	1	1	E	3	Guidance system	(AVMAV) Former (Audio Div.)	
1	1	1	1	1	1	F	3	AV selector, etc.	(AVMAVC) Former (Audiovisual Accessory Div.)	
0	0	0	0	1	1	0	F	Television	(AVMDP) Former (Television Div.)	
0	0	0	1	1	1	1	F	Monitors for professional use		
0	0	1	0	1	1	1	2	F		STB (Digital set top box)
0	0	1	1	1	1	1	3	F		
0	1	0	0	1	1	1	4	F	VHS	(AVMHS) Digital Video Storage Category Former (Video Div.)
0	1	0	1	1	1	1	5	F		
0	1	1	0	1	1	1	6	F	VHS (C)	
0	1	1	1	1	1	1	7	F	VHS (D)	
1	0	0	0	1	1	1	8	F	Cassette deck	(AVMAV) Former (Audio Div.)
1	0	0	1	1	1	1	9	F	General	
1	0	1	0	1	1	1	A	F	Amplifier, tuner	
1	0	1	1	1	1	1	B	F	Karaoke equipment/MD	
1	1	0	0	1	1	1	C	F		Professional Systems Company
1	1	0	1	1	1	1	D	F	Video printer	(AVMHS) Digital Video Storage Category Former (Video Div.)
1	1	1	0	1	1	1	E	F	DVD player	(Optical Disc Category)
1	1	1	1	1	1	1	F	F		(AVMAVC) Former (Audiovisual Accessory Div.)

- 4) **Function & operation code (D0 to D7)** The function & operation code shall not be specially prescribed to keep the freedom in design. However, in designing a total remote control unit it is highly desirable to use as many operation codes as possible which are common

to various kinds of equipment because it is advantageous from the standpoint of system designing.

Example Use of common codes for TV and VTR

Table 3 Function & operation code

The number in each () indicates a ten-key number.

Data code	TV	VTR	Data code	TV	VTR	Data code	TV	VTR
1 8	CH	CH	2 0	CH 16(0)	CH 16	2 8	CH 8 (8)	CH 8 (8)
1 9	CH	CH	2 1	CH 1 (1)	CH 1 (1)	2 9	CH 9 (9)	CH 9 (9)
1 A	POWER OFF	POWER OFF	2 2	CH 2 (2)	CH 2 (2)	2 A	CH 10	CH 10
1 B			2 3	CH 3 (3)	CH 3 (3)	2 B	CH 11	CH 11
1 C	MUTE		2 4	CH 4 (4)	CH 4 (4)	2 C	CH 12	CH 12
1 D	POWER ON	POWER ON	2 5	CH 5 (5)	CH 5 (5)	2 D	CH 13	CH 13
1 E	VOLUME		2 6	CH 6 (6)	CH 6 (6)	2 E	CH 14	CH 14
1 F	VOLUME		2 7	CH 7 (7)	CH 7 (7)	2 F	CH 15	CH 15

4. Prevention of malfunctions

- a) Frequency characteristics** The frequency of carrier shall be within $37.9 \text{ kHz} \pm -0.4 \text{ kHz}$.
- b) Checking of 17th bit** After the completion of code transmission, the existence of the 17th-bit pulse needs to be checked for a certain period of time (the time longer than a pulse interval between "0" and "1") and if the pulse is detected, the operation of equipment shall be stopped.
- c) Checking of two-word coincidence** Check the two-word coincidence.
- d) Checking of custom code** By check the custom code (Victor code + equipment code), it can be confirmed that it is the equipment's own code.
- e) Checking of bit structure** The t_H , t_L or $t_H + t_L$ in the figure below shall be checked. However, since changes in t_H and t_L may exceed the transmission format depending on the receiving conditions, they shall be designed with a sufficient allowance.

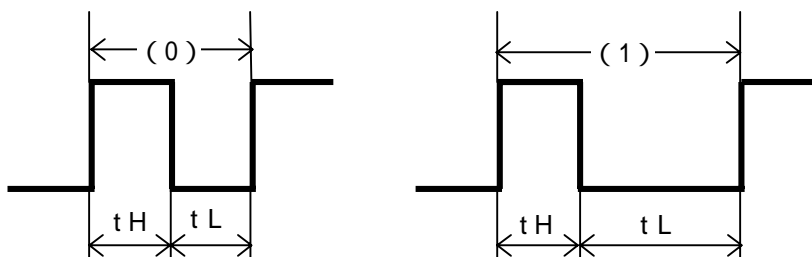


Fig. 5 Checking of bit structure

5. Control of remote control codes The remote control codes are controlled according to the Table below.

If any remote control codes are no longer used by unification and reorganization of divisions, they shall be informed to Engineering Planning & Coordination Dept. (EPCD) as soon as possible.

- **Registration of person in charge of control** A person in charge of control of remote control codes of each division shall be registered in Engineering Planning & Coordination Dept. (EPCD) [If the person in charge of control is changed, it shall be informed to (EPCD) as soon as possible.]

Table 4 Control of remote control codes

Remote control code	Control	Remarks
Maker code (C0 to C3)	Fixed at "1100" or "1111".	JVC's code
Equipment code (C4 to C7)	Engineering Planning & Coordination Dept. (EPCD)	Engineering Planning & Coordination Dept. (EPCD) E-mail (dist.vis@jvc-victor.jp)
Function & operation code (D0 to D7)	Person in charge of control of each division	The details shall be registered into the remote control DB. (ID is required to input or change the remote control DB.)

Date of Translation (into English)	1998/02/25 [2004/05/18]
Date of Establishment	1997/06/01
Date of Revision	2004/03/15
Date of Revision	2004/05/15
