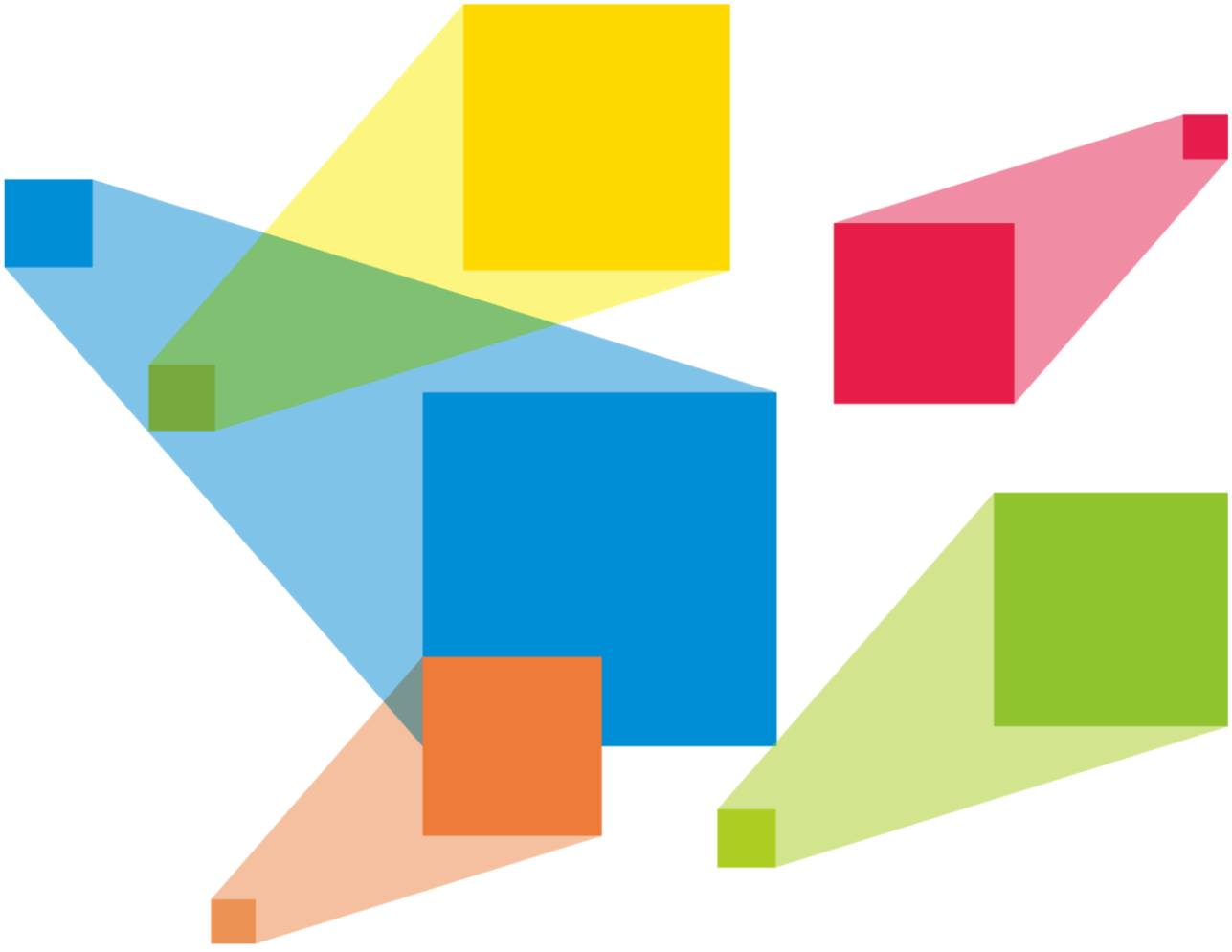
Control Protocol for Multimedia Playback Software

V2.1.3



Contents

1 Change History

Description	Version	Date
Added the function of controlling program play, pause and stop by program number.	V2.1.0	2024-9-30
Added the global volume adjustment. Added the global mute control.		
Added the layer mute control.		
Added the FTB (black screen) control.		
Added the function of turning pages for PowerPoint or media collection in specified layer.		
Added the function of sending the selected or specified program to screen.		
Added the notifications for deleting or adding programs.		
Added the function of retrieving layer list.	V2.1.1	2025-4-10
Added the function of enabling and disabling test pattern.		
Added the function of global play, pause and stop.		
Added the function of playing the previous or next program.	V2.1.2	2025-4-14
Added the function of pausing, playing, or stopping timeline.	V2.1.3	2025-5-27
Added the function of jumping to specified time on timeline.		

2 Communication Method

The multimedia playback software implements the UDP and TCP communication methods. The online and offline services of the software only support the UDP communication method. For other services, the remote control terminal will establish communication with the software based on the actual situation.

The default port for UDP communication is 18959, which can be modified in the software.

The port for UDP data reporting is 18961 and cannot be modified.

The default port for TCP communication is 19958, which can be modified in the software.

Description of program ID in this protocol: Normally, the program ID starts from 0, which is displayed on the software interface from left to right. If you delete, add, copy or paste a program, the program ID sequence will be disordered. After you restart the software, the program ID will be rearranged from 0. (Under normal circumstances, the program ID of program 1 is 0, the program ID of program 2 is 1, and the program ID of program 3 is 2)

Description of program number in this protocol: The program number starts from 0, which is displayed on the software interface from left to right. If you delete, add, copy or paste a program, the program number will not change. (Under normal circumstances, the program number of program 1 is 0, the program number of program 2 is 1, and the program number of program 3 is 2)

Description of layer number in this protocol: The layer number starts from 0, which is displayed on the software interface from top to bottom. (Under normal circumstances, the layer number of layer 1 is 0, the layer number of layer 2 is 1, and the layer number of layer 3 is 2)

3 Frame Structure of Communication Protocol

The frame structure for the data packets related to discovery strategy and control strategy follows the following constraints. The frame structure adopts the little-endian mode, which means that the higher byte of the data is stored in the higher memory address, while the lower byte of the data is stored in the lower memory address.

Name		Size (Byte)	Default Value	Description
Head	Head	4	0x55CC55CC	The communication protocol between the central control device end and media server
	Packet Type	2		Reserved
	Protocol Version	2		The version number of the protocol For example, 0x0101 indicates version 1.1
	Sequence	2		The sequence number of the packet Increment by the sender and start over from 0 when it reaches the maximum.
	Content Length	2		The total length of the content
Content	Tag	2		The service type
	Length	2		The content length of the service data
	Value[]	N		The service data (length is N)

The TLV structure is used in the Content area in the above table. TLV refers to a structure composed of data type (Tag), data length (Length), and data value (Value), which can be used to describe almost any data type. TLV value can also be a TLV structure. It is precisely because of this nesting feature that we can realize the implementation of the protocol.

Note: If value involves a string array, the actual maximum length of valid data is the array length - 1, and the last digit is '\0'.

4 Service Content of Communication Interaction

4.1 Add Program

Function	**Update Program**				
Requester	**Multimedia Playback Software**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	5	
	Length		2		
	Value[]	ProgramCount[]	4		Total number of programs
		ProgramIndex[]	4		Program index (program's position in the program list), starting from 0
		ProgramId[]	4		Program ID, starting from 0
		ProgramName[]	128		Program name (UTF-8 encoding)
		IsEmpty[]	1		Indicates whether it is an empty program (0: empty, 1: non-empty)
Responder	**None**				
Example	Total number of programs: Program: 2 Program name: empty Program: non-empty CC 55 CC 55 01 00 00 01 02 00 11 00 05 00 0D 00 05 00 00 00 02 00 00 00 02 00 00 00 01				

4.2 Delete Single Program

Function	**Delete Single Program**				
Requester	**Multimedia Playback Software**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	6	
	Length		2		
	Value[]	ProgramId[]	4		Program ID, starting from 0
Responder	**None**				
Example	Delete program 3: CC 55 CC 55 01 00 00 01 02 00 08 00 06 00 04 00 02 00 00 00				

4.3 Detect Software

Function	**Detect Software**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	255	Can be omitted
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
	Tag		2	128	
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
Example	CC 55 CC 55 00 00 01 01 03 00 44 00 80 00 40 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	
	Tag		2	1	
	Length		2		
	Value[]	HostName[]	64		Name of media server that contains multimedia playback software (UTF-8 encoding)
		Ip[]	16		Media server IP
		SoftName[]	32		Multimedia playback software name (UTF-8 encoding)
		SoftVersion[]	32		Multimedia playback software version
Example	CC 55 CC 55 01 00 00 01 00 00 94 00 01 00 90 00 31 36 30 30 37 36 39 35 2D 50 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 31 30 2E 34 30 2E 38 33 2E 33 30 00 00 00 00 00 4B 6F 6D 70 61 73 73 20 46 58 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 20 56 33 2E 38 2E 30 2E 44 32 2D 32 30 32 33 2D 31 30 2D 31 32 2D 30 39 2D 30 38 00 00 00 00 00				

4.4 Retrieve Program List

Function	**Retrieve Program List**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	255	Can be omitted
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
	Tag		2	129	
	Length		2		
	Value[]		0		
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 81 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	129	
	Length		2		
	Value[]	ProgramCount[]	4		Total number of programs
		ProgramIndex[]	4		Program ID index (relative to the total number), starting from 0
		ProgramId[]	4		Program ID, starting from 0
		ProgramName[]	128		Program name (UTF-8 encoding)
		IsEmpty[]	1		Indicates whether it is an empty program (0: empty, 1: non-empty)
Example	Total number of programs: 5 Program: 3 Program name: empty Program: non-empty CC 55 CC 55 01 00 00 01 02 00 11 00 81 00 0D 00 05 00 00 00 02 00 00 00 02 00 00 00 01				

4.5 Select Program

Function	**Select Specified Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	255	Can be omitted
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
	Tag		2	130	
	Length		2		
	Value[]	ProgramId[]	4		Program ID, starting from 0
Example	Select program 4: CC 55 CC 55 01 00 00 01 02 00 08 00 82 00 04 00 03 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	130	
	Length		2		
	Value[]				
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 82 00 00 00				

4.6 Send Specified Program to Screen (Fade In and Fade Out)

Function	**Send Specified Program to Screen (Fade In and Fade Out)**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	255	Can be omitted
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
	Tag		2	131	
	Length		2		
	Value[]	ProgramId[]	4		Program ID, starting from 0
Example	Fade in or fade out program 4: CC 55 CC 55 01 00 00 01 02 00 08 00 83 00 04 00 03 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	131	
	Length		2		
	Value[]				
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 83 00 00 00				

4.7 Send Specified Program to Screen (Cut)

Function	**Send Specified Program to Screen (Cut)**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	255	Can be omitted
	Length		2		
	Value[]	SoftName[]	64		Sender software name (UTF-8 encoding)
	Tag		2	132	
	Length		2		
	Value[]	ProgramId[]	4		Program ID, starting from 0
Example	Cut program 4: CC 55 CC 55 01 00 00 01 02 00 08 00 84 00 04 00 03 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	132	
	Length		2		
	Value[]				
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 84 00 00 00				

4.8 Pause Program

Function	**Pause Specified Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	133	
	Length		2		
	Value[]	ProgramId[]	4		Program ID, starting from 0
Example	Pause program 4: CC 55 CC 55 01 00 00 01 02 00 08 00 85 00 04 00 03 00 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	133	
	Length		2		
	Value[]				
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 85 00 00 00				

4.9 Enable FTB

Function	**Enable FTB**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	260	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Enable FTB: CC 55 CC 55 01 00 00 01 02 00 04 00 04 01 00 00				

4.10 Disable FTB

Function	**Disable FTB**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	261	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Disable FTB: CC 55 CC 55 01 00 00 01 02 00 04 00 05 01 00 00				

4.11 Enable Global Sound

Function	**Enable Global Sound**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	262	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Enable global sound: CC 55 CC 55 01 00 00 01 02 00 04 00 06 01 00 00				

4.12 Disable Global Sound

Function	**Disable Global Sound**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	263	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Disable global sound: CC 55 CC 55 01 00 00 01 02 00 04 00 07 01 00 00				

4.13 Adjust Global Volume

Function	**Adjust Global Volume**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	264	
	Length		2		
	Value[]	Volume[]	1		Volume value, ranging from 0 to 100
Responder	**None**				
Example	Set volume to 50: CC 55 CC 55 01 00 00 01 02 00 05 00 08 01 01 00 32				

4.14 Enable Layer Sound

Function	**Enable Specified Layer Sound**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	265	
	Length		2		
	Value[]	Layer[]	4		Layer index, starting from 0
Responder	**None**				
Example	Enable layer 2 sound: CC 55 CC 55 01 00 00 01 02 00 08 00 09 01 04 00 01 00 00 00				

4.15 Disable Layer Sound

Function	**Disable Specified Layer Sound**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	266	
	Length		2		
	Value[]	Layer[]	4		Layer index, starting from 0
Responder	**None**				
Example	Disable layer 2 sound: CC 55 CC 55 01 00 00 01 02 00 08 00 0A 01 04 00 01 00 00 00				

4.16 Increase Global Volume

Function	**Increase Global Volume**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	328	
	Length		2		
	Value[]	Volume[]	4		Volume (stepping: 1)
Responder	**None**				
Example	Increase global volume by 1: CC 55 CC 55 01 00 00 01 02 00 08 00 48 01 04 00 01 00 00 00				

4.17 Decrease Global Volume

Function	**Decrease Global Volume**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	329	
	Length		2		
	Value[]	Volume[]	4		Volume (stepping: 1)
Responder	**None**				
Example	Decrease global volume by 1: CC 55 CC 55 01 00 00 01 02 00 08 00 49 01 04 00 01 00 00 00				

4.18 Playback Control of PowerPoint or Other Media (Turn Pages) for Specified Layer

Function	**Turn Pages for PowerPoint/Excel/PDF/Word/Media Collections**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	364	
	Length		2		
	Value[]	LayerIndex	2		Layer index
		operationType	1		Operation types: 1. Previous page (supported media types: PowerPoint files, media collections) 2. Next page (supported media types: PowerPoint files, media collections)
Responder	**None**				
Example	Go to previous page of layer 3: cc 55 cc 55 01 00 00 01 02 00 07 00 6c 01 03 00 02 00 01				

4.19 Pause Program by Program Number

Function	**Pause Specified Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	365	
	Length		2		
	Value[]	Program[]	4		Program index, starting from 0
Responder	**None**				
Example	Pause program 8: CC 55 CC 55 01 00 00 01 02 00 08 00 6D 01 04 00 07 00 00 00				

4.20 Play Program by Program Number

Function	**Play Specified Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	366	
	Length		2		
	Value[]	Program[]	4		Program index, starting from 0
Responder	**None**				
Example	Play program 8: CC 55 CC 55 01 00 00 01 02 00 08 00 6E 01 04 00 07 00 00 00				

4.21 Stop Program by Program Number

Function	**Stop Specified Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	367	
	Length		2		
	Value[]	Program[]	4		Program index, starting from 0
Responder	**None**				
Example	Stop program 8: CC 55 CC 55 01 00 00 01 02 00 08 00 6F 01 04 00 07 00 00 00				

4.22 Global Play, Pause and Stop

Function	**Global Play, Pause and Stop**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	387	
	Length		2		
	Value[]	state[]	1		0: Play 1: Pause 2: Stop
Responder	**None**				
Example	Global play: CC 55 CC 55 01 00 00 01 02 00 05 00 83 01 01 00 01				

4.23 Retrieve Layer List

Function	**Retrieve Layer List**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	275	
	Length		2	0	
	Value[]	Data[]			
Example	CC 55 CC 55 01 00 00 01 02 00 04 00 13 01 00 00				
Responder	**Multimedia Playback Software**		**Response Method**	**UDP/TCP/Serial Port**	
Response TLV	Name		Length	Default Value	Description
	Tag		2	275	
	Length		2		Value indicates the layer list. Length is equal to the total number of lists multiplied by the length of a single Value.
	Value[]	LayerId[]	4		Layer index, starting from 0
		LayerName[]	32		Layer name (UTF-8 encoding)
Example	Layer name: empty Layer: 4 CC 55 CC 55 01 00 00 01 02 00 28 00 13 01 24 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00				

4.24 Enable Test Pattern

Function	**Enable Test Pattern**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	258	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Enable test pattern: CC 55 CC 55 01 00 00 01 02 00 04 00 02 01 00 00				

4.25 Disable Test pattern

Function	**Disable Test pattern**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	259	
	Length		2	0	
	Value[]	Data[]			
Responder	**None**				
Example	Disable test pattern: CC 55 CC 55 01 00 00 01 02 00 04 00 03 01 00 00				

4.26 Play Previous or Next Program

Function	**Play Previous or Next Program**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	388	
	Length		2		
	Value[]	state[]	1		0: Play previous program 1: Play next program
Responder	**None**				
Example	Play next program: CC 55 CC 55 01 00 00 01 02 00 05 00 84 01 01 00 01				

4.27 Pause, Play, or Stop Timeline

Function	**Pause, Play, or Stop Timeline**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	389	
	Length		2		
	Value[]	state[]	1		0: Pause timeline 1: Play timeline 2: Stop timeline 3: Play timeline from the beginning
Responder	**None**				
Example	Pause: CC 55 CC 55 01 00 00 01 02 00 05 00 85 01 01 00 00 Play: CC 55 CC 55 01 00 00 01 02 00 05 00 85 01 01 00 01				

4.28 Jump to Specified Time on Timeline

Function	**Jump to Specified Time on Timeline**				
Requester	**Central Control Device**		**Request Method**	**UDP/TCP/Serial Port**	
Request TLV	Name		Length	Default Value	Description
	Tag		2	390	
	Length		2		
	Value[]	state[]	4		Target time, in milliseconds
Responder	**None**				
Example	Jump to 00:10:00.000: CC 55 CC 55 01 00 00 01 02 00 08 00 86 01 04 00 C0 27 09 00 Jump to 00:00:06.000: CC 55 CC 55 01 00 00 01 02 00 08 00 86 01 04 00 70 17 00 00				