Audio Systems AM-CF1 External Control Protocol TCP/IP User Guide

Contents

Audio Systems AM-CF1 External Control Protocol TCP/IP

Overview

The protocols disclosed in this document are prepared to control AM-CF1 via third-party controllers or via a

computer based terminal application and obtain device information for further integrations.

It is required to log in by password authentication for starting controls and log out when finishing controls.

- Log-in
- Log-out

The following settings can be controlled.

- Speaker output gain
- Mute mode
- Recalling memory presets
- Standby mode
- Bluetooth mode
- Microphone beam steering
- Status notification
- Microphone beam steering status notification

The following commands can also be used to get the AM-CF1 setting values.

- Status request
  - Gain value
  - Mute mode
  - Preset number
  - Standby mode
  - Bluetooth mode
  - Microphone beam steering setting
  - Microphone beam steering position
- Status information
  - Microphone beam steering position information Real-time status of AM-CF1

Introduction

The external control port of AM-CF1 needs to be set before connecting to the unit by using this protocol.

- Target port
  TCP port number: Set the port number according to the remote controller to be connected.
  Default value: 3000

TCP/IP Communication Specification

#	Item	Contents implementation rules
1	Communication path	One pathway
2	Message length	Variable length max. 1024 bytes
3	Message code type	Binary
4	Confirmation of delivery	If a handshake is performed at the application layer and there is no respo nse from the AM-CF1 for 1 sec, it is preferable to design the communicati on timeout
5	Retransmission control	None
6	Priority control	None

- Define AM-CF1 as the TCP server.
- TCP port is always connected keeps alive .
- To maintain the connection, AM-CF1 performs the following operations.
- Send some data at least once in 10 seconds. If there is a status to be sent as data, the content is transmitted otherwise just send 0xFF by 1 byte.
- If nothing is received from the remote controller for one minute, the TCP/IP connection shall be automatically terminated.

Command Configuration

- Commands are 80H to FFH, data length is 00H to 7F, and data is 00H to FFH
- Data length N is included information representing the data length following the data
- When a data which is longer than the data length is received, the subsequent data is discarded.
- If a data is shorter than the data length and the next command is received, the previous command is discarded.
- When a TCP/IP communication is disconnected, it enables reconnection.

Control Commands and Setting Value

Log-in
Control commands are accepted only when the log-in information matches the password authentication information in the web browser. If they do not match, AM-CF1 returns a login NACK response as a command except log-in and log-out to the controller. If the communication with the controller is disconnected, the system will be logged out and the controller needs to log in again.
Once the AM-CF1 receives this command, it responds the password authentication result.
Command 80H, 20H, <User Name>, <Password>
<User Name> Specifies 16-byte ASCII codes
If the value is less than 16 bytes, the missing value is filled with the NULL character 0x00 . <Password> Specifies 16-byte ASCII codes
If the value is less than 16 bytes, the missing value is filled with the NULL character 0x00 .
 e.g. If User Name is admin and Password is admin =default setting
80H, 20H, 61H, 64H, 6DH, 69H, 6EH, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 61H, 64H, 6DH, 69H, 6EH, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H, 00H

AM-CF1 Response: The response is generated according to the password authentication result.
ACK response when matched: 80H, 01H, 01H
NACK response when not matched: 80H, 01H, 00H

Log-out

Turn the unit from login status to log-out status
Once the AM-CF1 receives this command, it turns the unit into log-out status and responds the operation result.
Command 81H, 00H
AM-CF1 Response 81H, 00H

Speaker output gain setting absolute position

Set the gain level of the speaker output by absolute position.
Please refer to the “Gain Table” chart to check the absolute positions corresponding to gain values dB . Once the AM-CF1 receives this command, it changes the gain level and responds the changed final value.
Command 91H, 03H, <Channel Attribute>, <Channel Number>, <Position>
<Channel Attribute>
01H: Speaker Out channel fixed value
<Channel Number>
00H: Channel Attribute fixed value * Channel Attribute 00H updates web gain settings
<Position>
00H to 3FH -∞ to 0dB, Please refer to “Gain Table” chart

AM-CF1 Response 91H, 03H, <Channel Attribute>, <Channel Number>, <Position>

Speaker output gain setting step
Set the gain level of the speaker output by position steps.
The gain position can be step up or down from the current position.
Each step changes one position.
Once the AM-CF1 received this command, it changes the gain position and responds the changed position value.
Command 91H, 03H, <Channel Attribute>, <Channel Number>, <Step>
<Channel Attribute>
01H: Speaker Out channel fixed value
<Channel Number>

00H: Channel Attribute fixed value *Channel Attribute 00H updates web gain settings

<Step>
UP: 41H to 5FH 1 step up to 31 step up, e.g. 1step up = 41H
Down: 61H to 7FH 1 step down to 31 step down, e.g. 1step down = 61H *The minimum value position for step down shall be 01H.

e.g. Increase the speaker output gain level by 3 steps
91H, 03H, 00H, 00H, 43H

AM-CF1 Response 91H, 03H, <Channel Attribute>, <Channel Number>, <Position>
<Position>
00H to 3FH -∞ to 0dB, Please refer to “Gain Table” chart

Mute mode setting

Set the mute mode of the audio input and output channels.
Once the AM-CF1 receives this command, it changes the mute mode and responds the changed final value.
Command 98H, 03H, <Channel Attribute>, <Channel Number>, <ON/OFF>
<Channel Attribute>
00H: Mic In channel
01H: Speaker Out channel

<Channel Number>
00H: Channel Attribute fixed value
<ON/OFF>
00H: Mute mode OFF unmuted
01H: Mute mode ON muted

AM-CF1 Response 98H, 03H, <Channel Attribute>, <Channel Number>, <ON/OFF>
Recalling memory presets
Recall a pre-stored memory preset.
Once the AM-CF1 receives this command, it recalls a pre-stored memory preset and responds the changed preset number.
Command F1H, 02H, 00H, <Preset Number>
<Preset Number>
00H to 01H: Preset Number 1 to 2

Standby mode setting

Set the standby mode of the unit.
Once the AM-CF1 receives this command, it changes the unit standby mode and responds the changed mode status.
Command F3H, 02H, 00H, <Standby mode>
<Standby mode>
00H: Standby mode OFF
01H: Standby mode ON

Bluetooth mode setting

Set the Bluetooth mode of the unit.
When the unit is set as ON mode, it starts Bluetooth pairing registration and becomes discoverable.

When the unit is set as OFF mode, it disconnects Bluetooth connection or cancels Bluetooth pairing registration.

Once the AM-CF1 receives this command, it changes the unit Bluetooth mode and responds the changed mode status.
Command F5H, 02H, 00H, <ON/OFF>
<ON/OFF >
00H:OFF Disconnect Bluetooth connection or cancel Bluetooth pairing registration
01H:ON Start Bluetooth pairing registration
e.g. Start Bluetooth pairing registration. F5H, 02H, 00H, 01H

AM-CF1 Response F5H, 02H, 00H, <Bluetooth Mode>
<Bluetooth Mode>
00H: OFF
01H: In pairing registration
02H: In connection

Bluetooth Mode Bluetooth Indicator	Bluetooth mode setting	
	ON	OFF
OFF OFF	Start Bluetooth pairing registration. Flashing blue	No action OFF
In pairing registration Flashing blue	Continue Bluetooth pairing registration. Flashing blue	Cancel Bluetooth pairing registration. OFF
In connection Blue	Maintain Bluetooth connection. Blue	Disconnect Bluetooth connection. OFF

Microphone beam steering setting

Set the microphone beam steering setting parameters. When the unit is set as Manual mode, the direction of the sound source is specified by Direction and the distance of the sound source is specified by Distance.
Command A0H, 05H, <Auto/Manual>,<Direction>,<Distance>,<inch/cm>
<Auto/Manual>
00H: Auto
01H: Manual
<Direction>
Signed 1-byte integer
For Manual: -90 to 90 [deg]
For Auto: 0
<Distance>
An unsigned two-byte integer expressed in big-endian decimal places.
For Manual:
<inch/cm> For inch: 0 to 2400 [inch per 10] 0.0 to 240.0 [inch]
<inch/cm> For cm: 0 to 6000 [cm per 10] 0.0 to 600.0 [cm]
For Auto: 0
<inch/cm>
Only Manual is used.
00H: inch
01H: cm
e.g. Set Auto
A0H, 05H, 00H, 00H, 00H, 00H, 00H
e.g. In the Manual mode, set the Direction at -90, the Distance at 240.0, and the unit of length as inch. A0H, 05H, 01H, A6H, 09H, 60H, 00H

Command List

Function	Command
Log-in	80H, 20H, <User Name>, <Password>
Log-out	81H, 00H
Speaker output gain setting absolute position	91H, 03H, <Channel Attribute>, <Channel Number>, <Position>
Speaker output gain setting step	91H, 03H, <Channel Attribute>, <Channel Number>, <Step>
Mute mode setting	98H, 03H, <Channel Attribute>, <Channel Number>, <ON/OFF >
Recalling memory presets	F1H, 02H, 00H, <Preset Number>
Standby mode setting	F3H, 02H, 00H, <Standby mode>
Bluetooth mode setting	F5H, 02H, 00H, <ON/OFF.
Microphone beam steering setting	A0H, 05H, <Auto/Manual>, <Direction>, <Distance>, <inch/cm>
Status notification setting	F2H, 02H, 00H, <ON/OFF >
Microphone beam steering status notification setting	F2H, 04H, 01H, <Interval>, <inch/cm>, <ON/OFF>
Status request gain position	F0H, 03H, 11H, <Channel Attribute>, <Channel Number>
Status request mute mode	F0H, 03H, 18H, <Channel Attribute>, <Channel Number>
Status request memory preset number	F0H, 02H, 71H, 00H
Status request standby mode	F0H, 02H, 72H, 00H
Status request Bluetooth mode	F0H, 02H, 74H, 00H
Status request microphone beam steering setting	F0H, 05H, 20H, 00H, 00H, 00H, 00H
Status request microphone beam steering position	F0H, 06H, 50H, 00H, 00H, 00H ,00H, <inch/cm>
Microphone beam steering position information	D0H, 06H, A0H, <X coordinate>, <Y coordinate>, <inch/cm>

Communication Examples

Function	Command	AM-CF1 Response
Log-in admin, admin	80H,20H,61H,64H,6DH,69H,6EH,00H, 00H,00H,00H,00H,00H,00H,00H,00H,	80H,01H,01H For NACK responses, the third byte is
	00H,00H,61H,64H,6DH,69H,6EH,00H,	00H
	00H,00H,00H,00H,00H,00H,00H,00H,	

	00H,00H	
Log-out	81H,00H	81H,00H
Speaker output gain setting 0dB	91H,03H,01H,00H,3DH	91H,03H,01H,00H,3DH
Speaker output gain setting 3 step up	91H,03H,01H,00H,43H	91H,03H,01H,00H,2DH When 2AH -19dB before 3stepup, become 2DH after 3stepup
Speaker output gain setting 3 step down	91H,03H,01H,00H,63H	91H,03H,01H,00H,2AH When 2DH -16dB before 3stepdown, become 2AH after 3stepdown
Mute mode setting ON	98H,03H,00H,00H,01H	98H,03H,00H,00H,01H
Mute mode setting OFF	98H,03H,00H,00H,00H	98H,03H,00H,00H,00H
Recalling memory presets preset1	F1H,02H,00H,00H	F1H,02H,00H,00H
Recalling memory presets preset2	F1H,02H,00H,01H	F1H,02H,00H,01H
Standby mode setting ON	F3H,02H,00H,01H	F3H,02H,00H,01H
Standby mode setting OFF	F3H,02H,00H,00H	F3H,02H,00H,00H
Bluetooth mode setting ON	F5H,02H,00H,01H	F5H,02H,00H,01H
Bluetooth mode setting OFF	F5H,02H,00H,00H	F5H,02H,00H,00H
Microphone beam steering setting	A0H,05H,00H,00H,00H,00H,00H	A0H,05H,00H,00H,00H,00H,00H
Auto		The position is notified by the beam steering position information command
		every set time.
		D0H,06H,A0H,F4H,48H,17H,70H,01H
Microphone beam steering setting	A0H,05H,01H,A6H,09H,60H,00H	A0H,05H,01H,A6H,09H,60H,00H
Manual, 90deg, 240.0inch		The position is notified by the microphone beam steering position
		information command.
Status notification setting ON	F2H,02H,00H,01H	F2H,02H,00H,01H

Status notification setting OFF	F2H,02H,00H,00H	F2H,02H,00H,00H
Microphone beam steering status notification setting ON	F2H,04H,01H,00H,00H,01H	F2H,04H,01H,00H,00H,01H
Microphone beam steering status notification setting OFF	F2H,04H,01H,00H,00H,00H	F2H,04H,01H,00H,00H,00H

Gain Table

Position		Gain dB	Position		Gain dB
00H	0	-∞	20H	32	-29
01H	1	-60	21H	33	-28
02H	2	-59	22H	34	-27
03H	3	-58	23H	35	-26
04H	4	-57	24H	36	-25
05H	5	-56	25H	37	-24
06H	6	-55	26H	38	-23
07H	7	-54	27H	39	-22
08H	8	-53	28H	40	-21
09H	9	-52	29H	41	-20
0AH	10	-51	2AH	42	-19
0BH	11	-50	2BH	43	-18
0CH	12	-49	2CH	44	-17
0DH	13	-48	2DH	45	-16
0EH	14	-47	2EH	46	-15
0FH	15	-46	2FH	47	-14
10H	16	-45	30H	48	-13
11H	17	-44	31H	49	-12
12H	18	-43	32H	50	-11
13H	19	-42	33H	51	-10
14H	20	-41	34H	52	-9

15H	21	-40	35H	53	-8
16H	22	-39	36H	54	-7
17H	23	-38	37H	55	-6
18H	24	-37	38H	56	-5
19H	25	-36	39H	57	-4
1AH	26	-35	3AH	58	-3
1BH	27	-34	3BH	59	-2
1CH	28	-33	3CH	60	-1
1DH	29	-32	3DH	61	0
1EH	30	-31	3EH	62	0
1FH	31	-30	3FH	63	0

Default value is 3DH
Position 00H is replaced to -60dB

Revision History

Ver.	Date of revision	Contents of establishment and change
0.0.1	March 23, 2018	1st revision released
1.0.0	May 7, 2018	The item of “speaker mute” is added.
1.0.1	May 23, 2018	The communication example is corrected according to the command s equence. Example of channel fader gain is modified. The explanation of switching for standby mode is corrected
1.0.2	May 28, 2018	The AM-CF1 response commands in “Communication example: 3step down” are corrected.
1.0.3	June 25, 2018	The mute mode setting speaker is added. Default value OFF for status notification setting AM-CF1 is added. Status request mute mode speaker is added.
1.0.4	July 23, 2018	Log-in and log-out are added. Status request beam steering is added.

1.0.5	August 1, 2018	The following communication commands examples are corrected. Mute mode setting Standby mode setting Status request standby mode Status request beam steering The Preset Setting name of the communication example is modified.
1.0.6	August 21, 2018	The status request beam steering is changed to the beam steering s etting.
1.0.7	September 5, 2018	Microphone beam steering setting is changed. Beam steering status n otification setting is added. Status request beam steering setting is a dded. Status request beam steering position is added. Beam steering position information is added. Command List Beam Steering is changed. Communication example B eam Steering is changed.
1.0.8	July 11, 2019	“*Note” description is deleted from the top page. Command Configurat ion description is changed. Data length of log-out is corrected. Description for speaker output gain setting absolute position is correc ted. Example data of speaker output gain setting step is corrected. Descri ption for microphone bean steering setting is corrected. Description for microphone bean steering status notification setting is corrected. Description for status request microphone beam steering position is corrected. X-coordinate of microphone beam steering position information is corr ected in status request. Command description in Command List is corrected.
1.0.9	July 12, 2019	A part of descriptions for speaker output gain setting absolute position is deleted. A part of descriptions for Gain table is deleted.
1.0.10	November 6,2019	Bluetooth mode setting is added. Status request Bluetooth mode is added.

Documents / Resources