

ARCAM

Custom Installation Notes: Serial programming interface and IR remote commands for Solo Movie, Movie 2.1 & Music



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Applicability

Changelog

Issue A.0: First draft

Controlling the Solo Movie/Music via RS232/NET

Introduction

This document describes the remote control protocol for controlling the Solo Movie/Music via the RS232/NET interface. The Solo Movie/Music implements virtual IR commands in order to simplify the protocol. Any operation that can be invoked using the IR remote control can be achieved over a control link using the Simulate RC5 IR command (0x08). See page 6 for details of this command. The RC5 IR code set is listed from page 20.

Set-up

IP control is via port 50000 of the IP address of the unit (in the Network Settings menu).

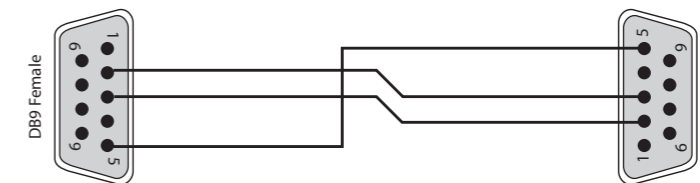
Conventions

- All hexadecimal numbers begin 0x.
- Any character in single quotes gives the ASCII equivalent of a hex value.
- <n> represents an unknown or variable number.

Command and response formats

Communication between the remote controller (RC) and the Solo Movie/Music takes the form of sequences of bytes, with all commands and responses having the same basic format. The Solo Movie/Music shall always respond to a received command, but may also send messages at other times.

Serial Cable Specification



The cable is wired as a null modem:

Connector 1 pin	Connector 2 pin	Function
2	3	Rx ← Tx
3	2	Tx → Rx
5	5	RS232 Ground

Data transfer format

- Transfer rate: 38,400bps.
- 1 start bit, 8 data bits, 1 stop bit, no parity, no flow control.

Each transmission by the RC is the following format:

<St> <Zn> <Cc> <Dl> <Data> <Et>

- St (Start transmission): 0x21 '!'.
- Zn (Zone number): see below.
- Cc (Command code): the code for the command.
- Dl (Data length): the number of data items following this item, excluding the ETR.
- Data: the parameters for the command.
- Et (End transmission): 0x0D.

Each response by the Solo Movie/Music is the following format:

<St> <Zn> <Cc> <Ac> <Dl> <Data> <Et>

- St (Start transmission): 0x21 '!'.
- Zn (Zone number): see below.
- Cc (Command code): the code for the command.
- Ac (Answer code): see below.
- Dl (Data Length): the number of data items following this item, excluding the ETR.
- Data: the parameters for the response of length n. n is limited to 255.
- Et (End transmission): 0x0D.

The Solo Movie/Music responds to each command from the RC within three seconds. The RC may send further commands before a previous command response has been received.

Answer codes

The following answer codes are defined:

- 0x00 – Status update.
- 0x82 – Zone Invalid.
- 0x83 – Command not recognised.
- 0x84 – Parameter not recognised.
- 0x85 – Command invalid at this time.¹
- 0x86 – Invalid data length.

¹Certain commands cannot be processed when the Setup Menu is being displayed. An answer code of 0x85 will be returned in these circumstances. Also, commands for tuner control cannot be processed when the tuner input is not selected, etc.

State changes as a result of other inputs

It is possible that the state of the Solo Movie/Music may be changed as a result of user input via the front panel buttons or via the IR remote control. Any change resulting from these inputs is relayed to the RC using the appropriate message type.

For example, if the user changed the front panel display brightness using the DISPLAY button on the front panel, a display message (defined below) would be sent to the RC. A similar action would be taken for all other state changes (including decode mode changes).

Reserved Commands

Commands 0xF0 to 0xFF (inclusive) are reserved for test functions and should never be used.

Example command and response sequence

As an example, the command to simulate the RC5 command “16-16”, volume up:

STR	ZONE	CC	DL	Data 1	Data 2	ETR
0x21	0x01	0x08	0x02	0x10	0x10	0x0D

Assuming that the command was accepted by the Solo Movie/Music and is being processed, the Solo Movie/Music responds to this command with the following sequence:

STR	ZONE	CC	AC	DL	Data 1	Data 2	ETR
0x21	0x01	0x08	0x00	0x02	0x10	0x10	0x0D

AMX Duet™ Support

The Solo Movie/Music shall be fully compatible with AMX Duet™ Dynamic Device Discovery Protocol (DDDP). The following description of Dynamic Device Discovery comes from the AMX website (www.amx.com). Dynamic Device Discovery is part of AMX's Duet™ platform, which combines the proven reliability and power of NetLinx with the extensive capabilities of the Java 2 Micro Edition (J2ME) platform. When integrating a serial or IP device from a manufacturer embedding the Dynamic Device Discovery Protocol (DDDP), Duet recognizes the device and loads the appropriate Duet module, which automatically installs the new device. AMX's NetLinx Master can then find and install the Duet device module either from a library on the master, from AMX's Web site, or from the manufacturer's Web site. Duet also allows for device swapping so that programming changes are not required when devices with DDDP are removed or replaced – a huge benefit for end users. The Duet platform is an extension AMX's InConcert® manufacturer partner program, which was developed to ensure seamless communication between partners' devices and the AMX control system.

Data is specified in the ASCII format. All ASCII characters between the quotes “” should be recognised/transmitted. “\r” is a carriage return (0x0D)

Command: “AMX\r”

Solo Movie Response:

“AMXB<Device-SDKClass=Receiver><Device-Make=ARCAM><Device-Model=Movie><Device-Revision=x.y.z>\r”

Solo Music Response:

“AMXB<Device-SDKClass=Receiver><Device-Make=ARCAM><Device-Model=Music><Device-Revision=x.y.z>\r”

Where

x.y.z = RS232 protocol version number.

System Command Specifications

Power (0x00)

Request the stand-by state of a zone.

Example

Command/response sequence to request the power state of zone 1 where zone 1 has power on:

Command: 0x21 0x01 0x00 0x01 0xF0 0x0D
Response: 0x21 0x01 0x00 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x00
Dl	0x01
Data	0xF0 – Request power state
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x00
Ac	Answer code
Dl	0x01
Data	0x00 – Zone is in stand-by 0x01 – Zone is powered on
Et	0x0D

Display Brightness (0x01)

Request the brightness of the front panel display.

Example

Command/response sequence for requesting the brightness of the display where the display is off:

Command: 0x21 0x01 0x01 0x01 0xF0 0x0D
Response: 0x21 0x01 0x01 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x01
Dl	0x01
Data	0xF0 – Request brightness
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x01
Ac	Answer code
Dl	0x01
Data	0x00 – Front panel is off 0x01 – Front panel L1 0x02 – Front panel L2
Et	0x0D

Headphones (0x02)

Determine whether headphones are connected.

Example

Command/response sequence to request the headphone status where the headphones are not connected:

Command: 0x21 0x01 0x02 0x01 0xF0 0x0D
Response: 0x21 0x01 0x02 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x02
Dl	0x01
Data	0xF0 – Request current headphone connection status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x02
Ac	Answer code
Dl	0x01 (Data length)
Data	0x00 – Headphones are not connected. 0x01 – Headphones are connected
Et	0x0D

FM genre (0x03)

Request information on the current station programme type from FM source in a given zone. If FM is not selected on the given zone an error 0x85 is returned.

Example

Command/response sequence to request the programme type on zone 1 where the programme type is "POP MUSIC":

Command: 0x21 0x01 0x03 0x01 0xF0 0x0D
Response: 0x21 0x01 0x03 0x00 0x09 0x50 0x4F 0x50 0x20 0x4D 0x55 0x53 0x49 0x43 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x03
Dl	0x01
Data1	Request information source: 0xF0 – FM program type
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x03
Ac	Answer code
Dl	Data length <n>
Data1 – Data<n>	The radio programme type in ASCII characters
Et	0x0D

Software version (0x04)

Request the version number of the software on the Solo Movie/Music.

Example

Command/response sequence to request the host version (1.4):

Command: 0x21 0x01 0x04 0x01 0xF1 0x0D
Response: 0x21 0x01 0x04 0x00 0x03 0xF1 0x01 0x04 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x04
Dl	0x01
Data	0xF1 – Request Host version
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x04
Ac	Answer code
Dl	0x03
Data1	Echo data from command
Data2	Major version number
Data3	Minor version number
Et	0x0D

Restore factory default settings (0x05)

Force a restore of the factory default settings.

Example

Command/response sequence to restore factory defaults:

Command: 0x21 0x01 0x05 0x02 0xAA 0xAA 0x0D
Response: 0x21 0x01 0x05 0x00 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x05
Dl	0x02
Data1	0xAA (Confirmation data pattern to avoid accidental restore)
Data2	0xAA (Confirmation data pattern to avoid accidental restore)
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x05
Ac	Answer code
Dl	0x00
Et	0x0D

Simulate RC5 IR Command (0x08)

Simulate an RC5 command via the RS232 port. An additional status message will be sent in most cases as a result of the IR command.

Example

Command/response sequence to RC5 16-17 (AVR volume down in zone 1):

Command: 0x21 0x01 0x08 0x02 0x10 0x11 0x0D
Response: 0x21 0x01 0x08 0x00 0x02 0x10 0x11 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x08
Dl	0x02
Data1	RC5 System code
Data2	RC5 Command code
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x08
Ac	Answer code
Dl	0x02
Data1	RC5 System code
Data2	RC5 Command code
Et	0x0D

Display Information Type (0x09)

Set the VFD display information type (where applicable).

The return data echoes the data sent.

Example

Command/response sequence to set the display text to show the current FM radio text with FM playing:

Command: 0x21 0x01 0x09 0x01 0x01 0x0D
Response: 0x21 0x01 0x09 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x09
Dl	0x01
Data	For all sources: 0x00 – Set the display to Default 0xE0 – Cycle though all displayable information. 0xF0 – Request the current display type If the current source is Bluetooth: 0x00 - Set the display to Title 0x01 – Set the display to Album 0x02 – Set the display to Artist 0x03 - Set the display to Audio CODEC If the current source is FM: 0x00 - Set the display to Station name 0x01 – Set the display to Programme Type 0x02 – Set the display to Radio Text 0x03 - Set the display to Format (Stereo/Mono) 0x04 – Set the display to Signal strength If the current source is DAB: 0x00 - Set the display to Programme Type 0x01 – Set the display to Radio Text 0x02 – Set the display to Bit Rate 0x02 – Set the display to Format (Stereo/Mono) 0x04 – Set the display to Signal Strength If the current source is a movie file: 0x00 – Set the display to File Time Elapsed 0x01 – Set the display to File Time Remaining 0x02 - Set the display to Audio CODEC 0x03 – Set the display to File Type 0x04 – Set the display to File Resolution and Framerate 0x05 - Set the display to Filename 0x06 - Set the display to Audio Post Processing mode If the current source is a music file: 0x00 – Set the display to File Time Elapsed 0x01 – Set the display to File Time Remaining 0x02 - Set the display to Title 0x03 - Set the display to Artist 0x04 – Set the display to Album 0x05 – Set the display to Genre 0x06 - Set the display to File Type 0x07 - Set the display to Filename 0x08 - Set the display to Audio Post Processing mode If the current source is a picture file: 0x00 – Set the display to File Type and Picture Size 0x01 – Set the display to Filename If the current source is a CD: 0x00 – Set the display to Track Time Elapsed 0x01 – Set the display to Track Time Remaining 0x02 - Set the display to Total Time Elapsed 0x03 – Set the display to Total Time Remaining 0x04 – Set the display to Title (for CD-Text) 0x05 - Set the display to Album (for CD-Text) 0x06 - Set the display to Artist (for CD-Text) 0x07 - Set the display to Performer (for CD-Text) 0x08 - Set the display to Audio Post Processing mode If the current source is a DVD/BD: 0x00 – Set the display to Track Time Elapsed 0x01 – Set the display to Title Time Remaining 0x02 - Set the display to Chapter Time Elapsed 0x03 – Set the display to Chapter Time Remaining 0x04 – Set the display to Audio CODEC 0x05 - Set the display to Video Output Resolution 0x06 - Set the display to Disc Name 0x07 - Set the display to Audio Post Processing mode
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x09
Ac	Answer code
Dl	0x01
Data	The current display is returned, as for the command.
Et	0x0D

Request current source (0x1D)

Request the source currently selected for a given zone.

Example

Command/response sequence to request the current source for Zone 1 where the source is set to 'SAT':

Command: 0x21 0x01 0x1D 0x01 0xF0 0x0D
Response: 0x21 0x01 0x1D 0x00 0x01 0x04 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1D
DI	0x01
Data	0xF0
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1D
Ac	Answer code
DI	0x01
Data	The current source in the indicated zone: 0x01 – Disc 0x03 – AV 0x04 – SAT 0x05 – PVR 0x08 – AUX 0x09 – TV 0x0B – TUNER (FM) 0x0C – TUNER (DAB) 0x0E – MEDIA 0x0F – ARC 0x10 – STB 0x11 – BT 0x12 – GAME 0x13 – LINE
Et	0x0D

Output Command Specifications

Set/Request Volume (0x0D)

Set or request the volume of a zone.

This command returns the volume even if the zone requested is in mute. The "Request Mute status" command can be used to discover if the zone is muted.

Response data format:
e.g. for volume 42dB: Data1=0x2A (42)

Example

Command/response sequence for setting the volume in Zone 1 to 45dB:

Command: 0x21 0x01 0x0D 0x01 0x2D 0x0D
Response: 0x21 0x01 0x0D 0x00 0x01 0x2D 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0D
DI	0x01
Data	0x00 (0) – 0x63 (99) – Set the volume 0xF0 – Request the current volume
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0D
Ac	Answer code
DI	0x01
Data1	Zone volume, integer value: 0x00 (0) – 0x63 (99)
Et	0x0D

Request Mute status (0x0E)

Request the mute status of the audio in a zone.

Example

Command/response sequence to request the mute status of zone 1 where zone 1 is muted:

Command: 0x21 0x01 0x0E 0x01 0xF0 0x0D
Response: 0x21 0x01 0x0E 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
DI	0x01
Data	0xF0 – Request mute status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
Ac	Answer code
DI	0x01
P2	0x00 – Zone is muted 0x01 – Zone is not muted
Et	0x0D

Request decode mode status — 2ch (0x10)

Request the decode mode for two-channel material in zone 1.

Example

Command/response sequence to request the decode mode in zone 1 where the mode is Pro Logic II Movie Mode:

Command: 0x21 0x01 0x10 0x01 0xF0 0x0D
Response: 0x21 0x01 0x10 0x00 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x10
DI	0x01
Data	0xF0 – Request decode mode
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x10
Ac	Answer code
DI	0x01
Data	0x01 – Stereo 0x02 – Dolby PLII Movie Mode 0x03 – Dolby PLII Music Mode
Et	0x0D

Request RDS information (0x12)

Request RDS information from the current radio station in a given zone. If FM is not selected on the given zone an error 0x85 is returned.

Example

Command/response sequence to request the RDS information on FM in zone 1, where the response is "Playing your favourite music".

Command: 0x21 0x01 0x12 0x01 0xF0 0x0D
Response: 0x21 0x01 0x12 0x00 0x1C 0x00 0x50 0x6C 0x61 0x79
0x69 0x6E 0x67 0x20 0x79 0x6F 0x75 0x72 0x20 0x66
0x61 0x76 0x6F 0x75 0x72 0x69 0x74 0x65 0x20 0x6D
0x75 0x73 0x69 0x63 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x12
DI	0x01
Data1	Request information source: 0xF0 – FM
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x12
Ac	Answer code
DI	Data length <n>
Data1 – Data<n>	The radio programme type in ASCII characters
Et	0x0D

Request preset details (0x1B)

Request details of tuner presets.

Example

Command/response sequence to request preset 1 where the response is a preset on DAB called “DAB STATION 2”:

Command: 0x21 0x01 0x1B 0x01 0x01 0x0D
 Response: 0x21 0x01 0x1B 0x00 0x0F 0x01 0x02 0x44 0x41 0x42 0x20 0x53 0x54 0x41 0x54 0x49 0x4F 0x4E 0x20 0x32 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1B
Dl	0x01
Data	0x01- 0x32: (1-50) The number of the required preset
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1B
Ac	Answer code
Dl	Data length <n>
Data1	0x01- 0x32: (1-50) The number of the requested preset
Data2	0x01 : FM frequency 0x02 : FM RDS name 0x03 : DAB
Data3	FM: New frequency (MHz)
Data4	FM: New frequency (10'skHz)
Data<n>	The name (DAB, FM if RDS) in ASCII characters
Et	0x0D

Network Command Specifications

Network playback status (0x1C)

Network message format.

If the network is not selected on the given zone an error 0x85 is returned.

Example

Command/response sequence where the network module is playing a file “File.mp3” on zone 1:

Command: 0x21 0x01 0x1C 0x01 0xF0 0x0D
 Response: 0x21 0x01 0x1C 0x00 0x09 0x01 0x46 0x69 0x6C 0x65 0x2e 0x6d 0x70 0x33 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1C
Dl	0x01
Data	0xF0 – Request Network playback status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1C
Ac	Answer code
Dl	Data length <n>
Data1	0x00 – Navigating 0x01 – Playing 0x02 – Paused 0xFF - Busy/Not Playing
Data2 – Data<n>	name of folder in ASCII if navigating name of file in ASCII if playing or paused
Et	0x0D

Subwoofer Trim (0x3F)

Adjust the value of subwoofer trim.

Example

Command/response sequence to set the subwoofer trim to -2.5dB:

Command: 0x21 0x01 0x3F 0x01 0x85 0x0D
 Response: 0x21 0x01 0x3F 0x00 0x01 0x85 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x3F
Dl	0x01
Data	0x00 — 0x14 – Set positive subwoofer trim in 0.5dB steps (e.g. 0x02 = +1.0dB) 0x81 — 0x94 – Set negative sub. trim in 0.5dB steps (e.g. 0x82 = -1.0dB) 0xF0 – Request current subwoofer trim value 0xF1 – Increment the subwoofer trim by 1dB 0xF2 – Decrement the subwoofer trim by 1dB
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x3F
Ac	Answer code
Dl	0x01
Data1	0x00 — 0x14 – Positive subwoofer trim in 0.5dB steps (e.g. 0x02 = +1.0dB) 0x81 — 0x94 – Negative subwoofer trim in 0.5dB steps (e.g. 0x82 = -1.0dB)
Et	0x0D

Lipsync Delay (0x40)

Adjust the lipsync delay value.

Example

Command/response sequence to set the lipsync delay to 50ms:

Command: 0x21 0x01 0x40 0x01 0x0A 0x0D
 Response: 0x21 0x01 0x40 0x00 0x01 0x0A 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x40
Dl	0x01
Data	0x00 — 0x32 – set the lipsync delay in 5ms steps (e.g. 0x08 = 40ms) 0xF0 – Request current lipsync delay value 0xF1 – Increment the lipsync delay by 5ms 0xF2 – Decrement the lipsync delay by 5ms
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x40
Ac	Answer code
Dl	0x01
Data1	0x00 — 0x32 – the lipsync delay in 5ms steps (e.g. 0x10 = 80ms)
Et	0x0D

Compression (0x41)

Adjust the dynamic range compression setting.

Example

Command/response sequence to set compression to on:

Command: 0x21 0x01 0x41 0x01 0x01 0x0D
 Response: 0x21 0x01 0x41 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x41
Dl	0x01
Data	0x00 – Compression off 0x01 – Set compression to on 0x02 – Set compression to auto 0xF0 – Request current compression setting
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x41
Ac	Answer code
Dl	0x01
Data1	0x00 – Compression off 0x01 – Compression on 0x02 – Compression auto
Et	0x0D

Request incoming video parameters (0x42)

Request the incoming video resolution, refresh rate and aspect ratio.

Example

Command/response sequence to request video parameters, where the video is 1280x720 (720p) 50Hz 16:9:

Command: 0x21 0x01 0x42 0x01 0xF0 0x0D
 Response: 0x21 0x01 0x42 0x00 0x07 0x05 0x00 0x02 0xD0 0x32 0x00 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x42
Dl	0x01
Data	0xF0 – Request incoming video parameters
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x42
Ac	Answer code
Dl	0x07
Data1	Horizontal resolution MSB (e.g. for 720p: 0x05 since 1280 = 0x0500)
Data2	Horizontal resolution LSB (e.g. for 720p: 0x00 since 1280 = 0x0500)
Data3	Vertical resolution MSB (e.g. for 720p: 0x02 since 720 = 0x02D0)
Data4	Vertical resolution LSB (e.g. for 720p: 0xD0 since 720 = 0x02D0)
Data5	Refresh rate for full image update (half the field rate for interlaced signals) (e.g. for 50Hz progressive: 0x32)
Data6	Interlaced flag: 0x00 – Progressive 0x01 – Interlaced
Data7	Aspect ratio: 0x00 – Undefined 0x01 – 4:3 0x02 – 16:9
Et	0x0D

Request incoming audio format (0x43)

Request the incoming audio format.

Example

Command/response sequence to request the incoming audio format, where the format is Dolby Digital 5.1:

Command: 0x21 0x01 0x43 0x00 0x01 0xF0 0x0D
Response: 0x21 0x01 0x43 0x00 0x02 0x02 0x1A 0xD0

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x43
Dl	0x01
Data	0xF0 – Request incoming audio format
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x43
Ac	Answer code
Dl	0x02
Data1	Audio stream format: 0x00 – PCM 0x01 – Analogue Direct 0x02 – Dolby Digital 0x03 – Dolby Digital EX 0x04 – Dolby Digital Surround 0x05 – Dolby Digital Plus 0x06 – Dolby Digital True HD 0x07 – DTS 0x08 – DTS 96/24 0x09 – DTS ES Matrix 0x0A – DTS ES Discrete 0x0B – DTS ES Matrix 96/24 0x0C – DTS ES Discrete 96/24 0x0D – DTS HD Master Audio 0x0E – DTS HD High Res Audio 0x0F – DTS Low Bit Rate 0x10 – DTS Core 0x13 – PCM Zero 0x14 – Unsupported 0x15 – Undetected
Data2	Audio channel configuration: 0x00 – Dual Mono 0x01 – Centre only 0x02 – Stereo only 0x03 – Stereo + mono surround 0x04 – Stereo + Surround L & R 0x05 – Stereo + Surround L & R + mono Surround Back 0x06 – Stereo + Surround L & R + Surround Back L & R 0x07 – Stereo + Surround L & R containing matrix information for surround back L&R 0x08 – Stereo + Centre 0x09 – Stereo + Centre + mono surround 0x0A – Stereo + Centre + Surround L & R 0x0B – Stereo + Centre + Surround L & R + mono Surround Back 0x0C – Stereo + Centre + Surround L & R + Surround Back L & R 0x0D – Stereo + Centre + Surround L & R containing matrix information for surround back L&R 0x0E – Stereo Downmix Lt Rt 0x0F – Stereo Only (Lo Ro) 0x10 – Dual Mono + LFE 0x11 – Centre + LFE 0x12 – Stereo + LFE 0x13 – Stereo + single surround + LFE 0x14 – Stereo + Surround L & R + LFE 0x15 – Stereo + Surround L & R + mono Surround Back + LFE 0x16 – Stereo + Surround L & R + Surround Back L & R + LFE 0x17 – Stereo + Surround L & R + LFE 0x18 – Stereo + Centre + LFE containing matrix information for surround back L&R 0x19 – Stereo + Centre + single surround + LFE 0x1A – Stereo + Surround L & R + LFE (Standard 5.1) 0x1B – Stereo + Centre + Surround L & R + mono Surround Back + LFE (6.1, e.g. DTS ES Discrete) 0x1C – Stereo + Centre + Surround L & R + Surround Back L & R + LFE (7.1) 0x1D – Stereo + Centre + Surround L & R + LFE, containing matrix information for surround back L&R (6.1 e.g. Dolby Digital EX) 0x1E – Stereo Downmix (Lt Rt) + LFE 0x1F – Stereo Only (Lo Ro) + LFE 0x20 – Unknown 0x21 – Undetected
Et	0x0D

Request incoming audio sample rate (0x44)

Request the incoming audio sample rate.

Example

Command/response sequence to request the incoming audio sample rate, where the rate is 48kHz:

Command: 0x21 0x01 0x44 0x01 0xF0 0x0D
Response: 0x21 0x01 0x44 0x00 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x44
Dl	0x01
Data	0xF0 – Request incoming audio sample rate
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x44
Ac	Answer code
Dl	0x01
Data1	Incoming audio sample rate: 0x00 – 32 KHz 0x01 – 44.1 KHz 0x02 – 48 KHz 0x03 – 88.2 KHz 0x04 – 96 KHz 0x05 – 176.4 KHz 0x06 – 192 KHz 0x07 – Unknown 0x08 – Undetected
Et	0x0D

Set/Request Output Frame Rate (0x50)

Set/Request the video output frame rate.

Example

Command/response sequence to set the frame rate to Auto:

Command: 0x21 0x01 0x50 0x01 0x00 0x0D
Response: 0x21 0x01 0x50 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x50
Dl	0x01
Data	0x00 – Set the frame rate to Auto. 0x02 – Set the frame rate to 50Hz. 0x03 – Set the frame rate to 60Hz. 0xF0 – Request the current frame rate. 0xF1 – Increment setting. 0xF2 – Decrement setting.
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x50
Ac	Answer code
Dl	0x01
Data1	0x00 – Auto. 0x02 – 50Hz. 0x03 – 60Hz.
Et	0x0D

FM Scan up/down (0x23)

Initiates a FM scan up or down. Note: only valid if on FM input

Example

Command/response to starting a FM scan up:

Command: 0x21 0x01 0x23 0x01 0x01 0x0D
Response: 0x21 0x01 0x23 0x00 0x01 0xFF 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x23
Dl	0x01
Data	0x01 - Scan up 0x02 - Scan down
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x23
Ac	Answer code
Dl	0x01
Data1	0xFF - scanning
Et	0x0D

DAB Scan (0x24)

Initiates a DAB scan. Note: only valid if on DAB input

Example

Command/response to starting a DAB scan:

Command: 0x21 0x01 0x24 0x01 0xF0 0x0D
Response: 0x21 0x01 0x24 0x00 0x01 0xFF 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x24
Dl	0x01
Data	0xF0 - Start DAB scan
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x24
Ac	Answer code
Dl	0x01
Data1	0xFF - scanning
Et	0x0D

Heartbeat (0x25)

Heartbeat command to check unit is still connected and communication - also resets the EuP standby timer.

Example

Command/response to sending a heartbeat command:

Command: 0x21 0x01 0x25 0x01 0xF0 0x0D
Response: 0x21 0x01 0x25 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x25
Dl	0x01
Data	0xF0 - Heartbeat
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x25
Ac	Answer code
Dl	0x01
Data1	0x00 - response
Et	0x0D

Reboot (0x26)

Forces a reboot of the unit.

Example

Command/response to sending a reboot command:

Command: 0x21 0x01 0x26 0x06 0x52 0x45 0x42 0x4F 0x4F 0x54 0x0D
Response: 0x21 0x01 0x26 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x26
Dl	0x06
Data1	0x52
Data2	0x45
Data3	0x42
Data4	0x4F
Data5	0x4F
Data6	0x54
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x26
Ac	Answer code
Dl	0x01
Data1	0x00 - response
Et	0x0D

Playback elapsed time (command code 0x28)

Requests the current playback time, track time (CD, MP3, etc) or title time (DVD, BD)

Example

Command/response sequence to request the current playback time where the playback time is 0h03m24s:

Command: 0x21 0x01 0x28 0x01 0xF0 0x0D
Response: 0x21 0x01 0x28 0x00 0x03 0x00 0x03 0x18 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x28
Dl	0x01
Data	0xF0 - Request elapsed time
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x28
Ac	Answer Code
Dl	0x03
Data1	Hours
Data2	Minutes
Data3	Seconds
Et	0x0D

Playback state/mode (command code 0x29)

Request unit playback state and mode

Example

Command/response sequence to request the playback state, where the playback state is tray closed, playing in repeat all random mode:

Command: 0x21 0x01 0x29 0x01 0xF0 0x0D

Response: 0x21 0x01 0x29 0x00 0x04 0x01 0x01 0x00 0x21 0x0D

COMMAND:	
Byte:	Description
St	0x21
Zn	0x01
Cc	0x29
DI	0x01
Data	0xF0 – Request playback state
Et	0x0D
RESPONSE:	
St	0x21
Zn	0x01
Cc	0x29
Ac	Answer Code
DI	0x04
Data1	Tray Status: 0x00 – Tray open 0x01 – Tray closed
Data2	Playback state: 0x00 – Stopped 0x01 – Playing 0x02 – Paused 0x03 – Resume-stop 0x04 – Scanning 0x0A – other state
Data3	Scanning/Slow play direction: 0x81 – Back 0x01 – Forward
Data4	Playback mode: 0x1x – Repeat one 0x2x – Repeat all 0xx1 – Random Note it is possible for random and repeat modes to be on together, hence the use of upper and lower nibbles to be used for the status of each.
Et	0x0D

Title/Chapter information (command code 0x2D)

Request the current title/track/chapter information.

Example

Command/response sequence for requesting current title/track/chapter information where the title is 3 and the chapter is 14:

Command: 0x21 0x01 0x2D 0x01 0xF0 0x0D

Response: 0x21 0x01 0x2D 0x00 0x03 0x03 0x0E 0x00 0x0D

COMMAND:	
Byte:	Description
St	0x21
Zn	0x01
Cc	0x2D
DI	0x01
Data	0xF0 – Request current title/track/chapter
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x2D
Ac	Answer Code
DI	0x03
Data1	DVD-Video : Current Title Number Blu-ray: Current Title Number Else: 0x00
Data2	MSB: DVD-Video : Current Chapter Blu-ray: Current Chapter Else: Current Track
Data3	LSB: DVD-Video : Current Chapter Blu-ray: Current Chapter Else: Current Track
Et	0x0D

Source Type (command code 0x2C)

Request the current source type

Example

Command/response sequence to request the source type where the source is a Blu-ray Disc:

Command: 0x21 0x01 0x2C 0x01 0xF0 0x0D

Response: 0x21 0x01 0x2C 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description
St	0x21
Zn	0x01
Cc	0x2C
DI	0x01
Data	0xF0 – Request source type
Et	0x0D
RESPONSE:	
St	0x21
Zn	0x01
Cc	0x2C
Ac	Answer Code
DI	0x01
Data	0x00 – Blu-ray 0x01 – DVD-video 0x02 – CD 0x03 – Data disc 0x04 – USB media 0x05 – Network media 0x20 – No Media
Et	0x0D

Solo Music/Movie RC5 command codes

These codes are recognised as infra-red signals received by the front panel, RC5 electrical signals received by the remote in jacks and as control data using the 'Simulate RC5 IR Command' (0x 08).

Function	RC5 code [system-command]	RC5 code (Data1 - Data2)
	Decimal	Hexadecimal
Standby (toggle)	16-12	0x10 - 0x0C
Eject	16-45	0x10 - 2D
1	16-1	0x10 - 0x01
2	16-2	0x10 - 0x02
3	16-3	0x10 - 0x03
4	16-4	0x10 - 0x04
5	16-5	0x10 - 0x05
6	16-6	0x10 - 0x06
7	16-7	0x10 - 0x07
8	16-8	0x10 - 0x08
9	16-9	0x10 - 0x09
Access Lipsync Delay control	16-50	0x10 - 0x32
0	16-0	0x10 - 0x00
Info	16-55	0x10 - 0x37
RW	16-121	0x10 - 0x79
FF	16-52	0x10 - 0x34
Skip Back	16-33	0x10 - 0x21
Skip Fwd	16-10	0x10 - 0x0A
Stop	16-54	0x10 - 0x36
Play	16-53	0x10 - 0x35
Pause	16-48	0x10 - 0x30
Disc (not used)	16-90	0x10 - 0x5A
Menu	16-66	0x10 - 0x42
Navigate Up	16-86	0x10 - 0x56
Pop Up	16-67	0x10 - 0x43
Navigate Left	16-81	0x10 - 0x51
OK	16-87	0x10 - 0x57
Navigate Right	16-80	0x10 - 0x50
Audio	16-69	0x10 - 0x45
Navigate Down	16-85	0x10 - 0x55
RTN	16-72	0x10 - 0x48
HOME	16-74	0x10 - 0x4A
Mute	16-13	0x10 - 0x0D
Increase volume (+)	16-16	0x10 - 0x10
Mode	16-32	0x10 - 0x20
Disp	16-59	0x10 - 0x3B
Subt	16-65	0x10 - 0x41
Decrease volume (-)	16-17	0x10 - 0x11
Red	16-41	0x10 - 0x29
Green	16-42	0x10 - 0x2A
Yellow	16-43	0x10 - 0x2B
Blue	16-15	0x10 - 0x0F
RADIO	16-91	0x10 - 0x5B
BT	16-11	0x10 - 0x0B
MEDIA	16-92	0x10 - 0x5C
DISC	16-93	0x10 - 0x5D
AV	16-94	0x10 - 0x5E
SAT	16-95	0x10 - 0x5F
PVR	16-96	0x10 - 0x60
GAME	16-97	0x10 - 0x61
LINE	16-98	0x10 - 0x62
AUX	16-99	0x10 - 0x63
STB	16-100	0x10 - 0x64

Function	RC5 Code [system-command]	RC5 Code (Data1 - Data2)
	Decimal	Hexadecimal
TV	16-101	0x10 - 0x65
ARC	16-102	0x10 - 0x66
Cycle between output resolutions	16-47	0x10 - 0x2F
Power On	16-123	0x10 - 0x7B
Power Off	16-124	0x10 - 0x7C

Advanced Functions

These RC5 codes are not present on the supplied remote control but have been created for custom install use. In order for the Solo Movie/Music to respond to these codes they must be transmitted from a programmable IR remote control or over the control link using the 'Simulate RC5 IR Command' (0x08).

Function	RC5 Code [system-command]	RC5 Code (Data1 - Data2)
	Decimal	Hexadecimal
Random	16 - 56	0x10 - 0x38
Repeat	16 - 49	0x10 - 0x31
Dolby PL II Movie	16-103	0x10 - 0x67
Dolby PL II Music	16-104	0x10 - 0x68
Stereo	16-107	0x10 - 0x6B
Mute On	16-119	0x10 - 0x77
Mute Off	16-120	0x10 - 0x78
FM	16-18	0x10 - 0x12
DAB	16-19	0x10 - 0x13
Lip Sync +5ms	16-20	0x10 - 0x14
Lip sync -5ms	16-21	0x10 - 0x15
Sub trim +0.5dB	16-105	0x10 - 0x69
Sub trim -0.5dB	16-108	0x10 - 0x6C
Video out Preferred/Best	16-125	0x10 - 0x7D
Video out SD Prog	16-73	0x10 - 0x49
Video out 720p	16-23	0x10 - 0x17
Video out 1080i	16-26	0x10 - 0x1A
Video out 1080p	16-27	0x10 - 0x1B
Video out 4k	16-76	0x10 - 0x4C
Frame Rate Auto	16-63	0x10 - 0x3F
Frame Rate 50	16-64	0x10 - 0x40
Frame Rate 60	16-57	0x10 - 0x39
Display Off	16-31	0x10 - 0x1F
Display L1	16-62	0x10 - 0x3E
Display L2	16-35	0x10 - 0x23

ARCAM