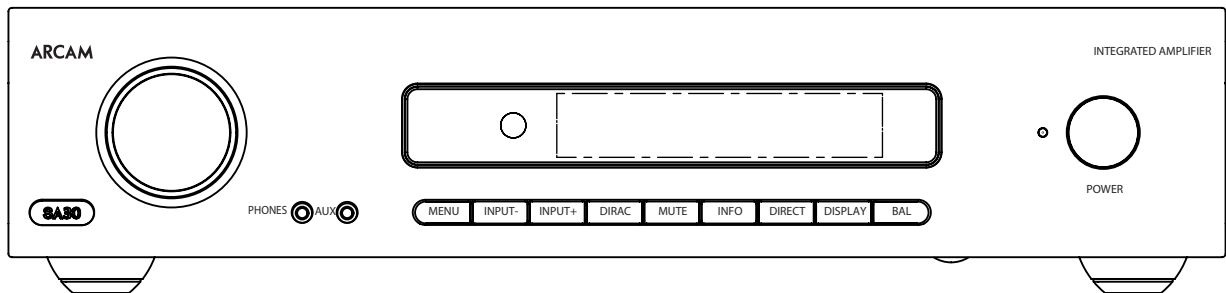


# ARCAM

## Custom Installation Notes

### IP/Serial programming interface and IR remote control commands for the SA30 integrated amplifier



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## Applicability

This document applies to the Arcam SA30 integrated amplifier.

### Revision history

Issue A.0:	Initial revision
Issue B.0:	Additional network commands
Issue 1.0:	First release version

# Controlling via RS232/NET

## Introduction

This document describes the remote control protocol for controlling via the RS232/NET interface.

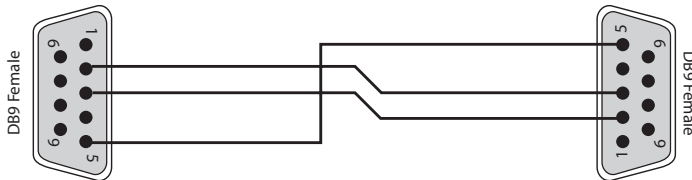
## Set-up

IP control is via port 50000 of the IP address of the unit.

## 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.

## 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
- Data format: 8 data bits, 1 stop bit, no parity, no flow control.

## Command and response formats

Communication between the remote controller (RC) and the SA30 takes the form of sequences of bytes, with all commands and responses having the same basic format. The SA30 shall always respond to a received command, but may also send messages at other times.

Each transmission by the RC has the following format:

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

Each response by the SA30 has the following format:

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

The SA30 responds to each command from the RC within three seconds. The RC may send further commands before a previous command response has been received.

## Zone numbers

The following zone numbers are defined:

- 0x01 – Zone number 1. (Zone 1 is the master zone. Commands that appear zone-less refer to the master zone)
- 0x02 – Zone number 2

## 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 (see **NOTE** below)
- 0x86 – Invalid data length.

**NOTE:** Certain 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 SA30 may be changed as a result of user input via front panel or remote. Any change resulting from these inputs is relayed to the RC using the appropriate message type.

## 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” (increase volume):

St	Zn	Cc	DI	Data 1	Data 2	Et
0x21	0x01	0x08	0x02	0x10	0x10	0x0D

Assuming that the command was accepted by the SA30 and is being processed, the SA30 responds to this command with the following sequence:

St	Zn	Cc	Ac	DI	Data 1	Data 2	Et
0x21	0x01	0x08	0x00	0x02	0x10	0x10	0x0D

## AMX Duet™ support

The SA30 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](http://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"

Response: "AMXB<Device-SDKClass=Amplifier><Device-Make=ARCAM><Device-Model=SA30><Device-Revision=x.y.z>\r"

Where,

x.y.z = RS232 protocol version number.

# System Command Specifications

## Power (0x00)

Set/request the stand-by state of a zone.

### Example

Command/response sequence to request the power state of the unit where the unit 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
DI	0x01
Data	0x00 – Power off 0x01 – Power on 0x02 – Power toggle 0xF0 – Request power state
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x00
Ac	Answer code
DI	0x01
Data	0x00 – Zone is in standby 0x01 – Zone is powered on
Et	0x0D

## Display brightness (0x01)

Set/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	Zone number
Cc	0x01
DI	0x01
Data	0x00 – Set brightness to off 0x01 – Set brightness to dim 0x02 – Set brightness to full 0xF0 – Request display brightness
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x01
Ac	Answer code
DI	0x01
Data	0x00 – Display brightness is off 0x01 – Display brightness is dim 0x02 – Display brightness is full
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	Zone number
Cc	0x02
DI	0x01
Data	0xF0 – Request current headphone connection status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x02
Ac	Answer code
DI	0x01 (Data length)
Data	0x00 – Headphones are not connected. 0x01 – Headphones are connected
Et	0x0D

## Software version (0x04)

Request the firmware version

### Example

Command/response sequence, where the response is HOST version 1.2:

Command: 0x21 0x01 0x04 0x01 0xF0 0x0D  
Response: 0x21 0x01 0x04 0x00 0x02 0xF0 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x04
DI	0x01
Data	0xF0 – request software version 0xF1 - request NET version
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x04
Ac	Answer code
DI	0x02
Data1	Echo data from command
Data2	0x?? – major version number
Data3	0x?? – minor version number
Et	0x0D

### Factory reset (0x05)

This command resets the unit to factory defaults.

#### Example

Command/response sequence for resetting the unit to factory defaults:

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

Response: 0x21 0x01 0x05 0x00 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
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	Zone number
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 (volume down):

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

## 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 45: Data=0x2D (45)

### Example

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

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 0xF1 – Increment volume by 1 step 0xF2 – Decrement volume by 1 step
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0D
Ac	Answer code
DI	0x01
Data	Zone volume, integer value: 0x00 (0) – 0x63 (99)
Et	0x0D

## Mute/unmute (0x0E)

Set/Request the mute status of the output.

### Example

Command/response sequence for requesting the mute status of output where the result is unmuted:

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

Response: 0x21 0x01 0x0E 0x00 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
DI	0x01
Data	0x00 – Mute 0x01 – Unmute 0x02 – Mute toggle 0xF0 – Request mute status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
Ac	Answer code
DI	0x01
Data	0x00 – Muted 0x01 – Unmuted
Et	0x0D



### Direct mode status (0x0F)

Set or request the analogue input direct mode of an input

#### Example

Command/response sequence to request the direct mode status where the mode is direct and input is CD:

Command: 0x21 0x01 0x0F 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x0F 0x00 0x02 0x06 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x0F
DI	0x01 (Query), 0x02 for setting
Data 1	0x01 – Phono 0x02 – AUX 0x03 – PVR 0x05 – STB 0x06 – CD 0xF0 – Request mode setting of current input
Data 2	0x00 – Turn 'Direct mode' off 0x01 – Turn 'Direct mode' on
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x0F
Ac	Answer code
DI	0x01
Data 1	0x01 – Phono 0x02 – AUX 0x03 – PVR 0x05 – STB 0x06 – CD
Data 2	0x00 – 'Direct mode' is off 0x01 – 'Direct mode' is on
Et	0x0D

### 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.

Command: 0x21 0x01 0x1C 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x1C 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1C
DI	0x01
Data	0xF0 – Request Network playback status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1C
Ac	Answer code
DI	0x01
Data1	0x00 – Stopped 0x01 – Transitioning 0x02 – Playing 0x03 – Paused
Et	0x0D

## Current input source (0x1D)

Set/request the current input source.

### Example

Command/response sequence to request the current source for Zone 1 where the source is set to 'PVR' and set to processor mode:

Command: 0x21 0x01 0x1D 0x01 0xF0 0x0D

Response: 0x21 0x01 0x1D 0x00 0x01 0x13 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1D
DI	0x01
Data	0x01 – Phono 0x02 – AUX 0x03 – PVR 0x04 – AV 0x05 – STB 0x06 – CD 0x07 – BD 0x08 – SAT 0x09 – GAME 0x0C – USB 0x0D – ARC 0xF0 – Request input
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1D
Ac	Answer code
DI	0x02
Data	The current source in the indicated zone: 0x01 – Phono 0x(N)2 – AUX 0x(N)3 – PVR 0x(N)4 – AV 0x(N)5 – STB 0x(N)6 – CD 0x(N)7 – BD 0x(N)8 – SAT 0x(N)9 – GAME 0x0B – NET 0x0C – USB 0x0D – ARC N = 0 indicates source is normal mode N = 1 indicates source is set to processor (fixed gain) mode
Et	0x0D

## Headphone override (0x1F)

Activate/deactivate the mute relays (does not zero the volume).

### Example

Command/response sequence to activate the mute relays:

Command: 0x21 0x01 0x1F 0x01 0x01 0x0D

Response: 0x21 0x01 0x1F 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1F
DI	0x01
Data	0x00 – Headphone/Over-ride Clear (speakers muted if headphones present) 0x01 – Headphone/Over-ride Set (speakers unmuted if headphones present) 0xF0 – Request Headphone/Over-ride status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x1F
Ac	Answer code
DI	0x01
Data	Relay state
Et	0x0D

## Heartbeat (0x25)

Heartbeat command to check unit is still connected and communicating - 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	Zone number
Cc	0x25
DI	0x01
Data	0xF0 – Heartbeat
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x25
Ac	Answer code
DI	0x01
Data	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	Zone number
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
Data	0x00 – Response
Et	0x0D

## Network (0x30)

Request network info.

### Example

Command/response sequence for requesting the IP address, where the address is 192 168 1 1

Command: 0x21 0x01 0x30 0x01 0xF0 0x0D

Response: 0x21 0x01 0x30 0x00 0x04 0xC0 0xA8 0x01 0x010x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x30
Dl	0x01
Data1	0xF0 - Request IP address 0xF1 - Request Wired MAC address 0xF2 - Request WiFi MAC address 0xF3 - Request Friendly name 0xF4 - Request Host Name 0xF5 - Request SSID
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x30
Ac	Answer code
Dl	0x04 (IP), 0x06 (MAC), <n> (Name)
	IP Address
Data1	0x?? First byte of IP address
Data2	0x?? Second byte of IP address
Data3	0x?? Third byte of IP address
Data4	0x?? Forth byte of IP address
	Wired/WiFi MAC Address
Data1	0x?? First byte of MAC address
Data2	0x?? Second byte of MAC address
Data3	0x?? Third byte of MAC address
Data4	0x?? Forth byte of MAC address
Data5	0x?? Fifth byte of MAC address
Data6	0x?? Sixth byte of MAC address
	Friendly/Host name
Data1 - Data <n-1>	Friendly name in ASCII characters
	SSID
Data1 - Data <n-1>	SSID in ASCII characters
Et	0x0D

## Room EQ names (0x34)

Request Room EQ name(s).

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x34
DI	0x01
Data1	0xF0 - request EQ names
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x34
Ac	Answer code
DI	0xn - dependant on number of EQ slots filled, 20, 40, 60, 80,100, 120
Data1-20	EQ1 name (read only / 20 characters) name in ASCII characters
Data21-40	EQ2 name (read only / 20 characters) name in ASCII characters
Data41-60	EQ3 name (read only / 20 characters) name in ASCII characters
Data61-80	EQ4 name (read only / 20 characters) name in ASCII characters
Data81-100	EQ5 name (read only / 20 characters) name in ASCII characters
Data101-120	EQ6 name (read only / 20 characters) name in ASCII characters
Et	0x0D

## Room Equalisation (0x37)

Turn the room equalisation system on/off.

### Example

Command/response sequence to turn the room equalisation 1 on:

Command: 0x21 0x01 0x37 0x01 0xF1 0x0D

Response: 0x21 0x01 0x37 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x37
DI	0x01
Data	0xF0 - Request current Room EQ state 0x00 - Room EQ off 0x01 - Room EQ 1 on 0x02 - Room EQ 2 on 0x03 -Room EQ 3 on 0x04 -Room EQ 4 on 0x05 -Room EQ 5 on 0x06 -Room EQ 6 on
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x37
Ac	Answer code
DI	0x01
Data1	0x00 - Room EQ is off 0x01 - Room EQ 1 is on 0x02 - Room EQ 2 is on 0x03 - Room EQ 3 is on 0x04 - Room EQ 4 is on 0x05 - Room EQ 5 is on 0x06 - Room EQ 6 is on 0x0A - Room EQ has not been calculated and is therefore off
Et	0x0D

## Balance (0x3B)

Adjust the balance control.

### Example

Command/response sequence to set the balance 3dB to the left:

Command: 0x21 0x01 0x3B 0x01 0x83 0x0D

Response: 0x21 0x01 0x3B 0x00 0x01 0x83 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x3B
Dl	0x01
Data	0x00 – Set the balance to the centre 0x01 – 0x0C – Set the balance to the right 1, 2, ..., 11, 12 0x81 – 0x8C – Set the balance to the left 1, 2, ..., 11, 12 0xF0 – Request current balance 0xF1 – Move the balance right by 1dB 0xF2 – Move the balance left by 1dB
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x3B
Ac	Answer code
Dl	0x01
Data	0x00 – Balance is Centred 0x00 – 0x0C – Balance is Right 1, 2, ..., 11, 12 0x81 – 0x8C – Balance is Left 1, 2, ..., 11, 12
Et	0x0D

## 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	Zone number
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
Data	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

### DC offset (0x51)

Request the output DC offset status.

#### Example

Command/response sequence for requesting the DC offset status where the result is no DC offset:

Command: 0x21 0x01 0x51 0x01 0xF0 0x0D  
Response: 0x21 0x01 0x51 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x51
DI	0x01
Data	0xF0 – Request DC offset status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x51
Ac	Answer code
DI	0x01
Data	0x00 - OK 0x01 - DC offset detected
Et	0x0D

### Short circuit status (0x52)

Request the output short circuit status.

#### Example

Command/response sequence for requesting the short circuit status, where the result is no short circuit:

Command: 0x21 0x01 0x52 0x01 0xF0 0x0D  
Response: 0x21 0x01 0x52 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x52
DI	0x01
Data	0xF0 – Request short circuit status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x52
Ac	Answer code
DI	0x01
Data	0x00 - No short circuit detected 0x01 - One of the channels has short circuit fault
Et	0x0D



### Timeout counter (0x55)

This command requests the time left (in minutes) until unit enters auto standby.

#### Example

Command/response sequence for requesting the time left until timeout:

Command: 0x21 0x01 0x55 0x01 0xF0 0x0D

Response: 0x21 0x01 0x55 0x00 0x02 0x00 0xF0 0x0D

In this example, the timeout value is 0x00B4, which translates to 180 minutes (i.e. 3 hours). The range of the value returned is from 0x0000 - 0x00F0 (0 - 240 minutes)

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x55
Dl	0x01
Data	0xF0
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x55
Ac	Answer code
Dl	0x02
Data1	0x00 (First byte of timeout counter, value is fixed)
Data2	0x00 - 0xF0 (Second byte timeout counter)
Et	0x0D

### Lifter temperature (0x56)

Request the temperature of the lifter.

#### Example

Command/response sequence for requesting the temperature of the lifter where the result is 75degC:

Command: 0x21 0x01 0x56 0x01 0xF0 0x0D

Response: 0x21 0x01 0x56 0x00 0x01 0x4B 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x56
Dl	0x01
Data	0xF0 - Request lifter temperature
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x56
Ac	Answer code
Dl	0x01
Data	0x?? - Temperature in deg C in hex, e.g. 75degC = 4B
Et	0x0D

### Output temperature (0x57)

Request the temperature of the output stage.

#### Example

Command/response sequence for requesting the temperature of the output where the result is 75 degC:

Command: 0x21 0x01 0x57 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x57 0x00 0x01 0x4B 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x57
DI	0x01
Data	0xF0 – Request output temperature
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x57
Ac	Answer code
DI	0x01
Data	0x?? – Temperature in deg C in hex, e.g. 75degC = 4B
Et	0x0D

### Auto shutdown control (0x58)

Set time for when unit will go into standby state due to no signal being present

#### Example 1

Command/response sequence, the signal sense auto shutdown timeout has been set to 60 minutes:

Command: 0x21 0x01 0x58 0x01 0x03 0x0D  
 Response: 0x21 0x01 0x58 0x00 0x01 0x03 0x0D

#### Example 2

Command/response sequence, the signal sense auto shutdown has been disabled:

Command: 0x21 0x01 0x58 0x01 0x00 0x0D  
 Response: 0x21 0x01 0x58 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x58
DI	0x01
Data	0x00 – Disable (Default) 0x01 – 20 min 0x02 – 30 min 0x03 – 1 hour 0x04 – 2 hours 0x05 – 4 hours 0xF0 – Request timeout status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x58
Ac	Answer code
DI	0x01
Data	0x00 – Disabled 0x01 – 20 min 0x02 – 30 min 0x03 – 1 hour 0x04 – 2 hours 0x05 – 4 hours
Et	0x0D

## PHONO input type (0x59)

Set or request Phono input type.

### Example

Command/response sequence where PHONO input is set to Moving Magnet type

Command: 0x21 0x01 0x59 0x01 0x00 0x0D  
Response: 0x21 0x01 0x59 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x59
DI	0x01
Data	0x00 - Set PHONO input to Moving Magnet type 0x01 - Set PHONO input to Moving Coil type 0xF0 - Request PHONO input type
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x59
Ac	Answer code
DI	0x01
Data	0x00 - PHONO input set to Moving Magnet type 0x01 - PHONO input set to Moving Coil type
Et	0x0D

## Input detect (0x5A)

Request the status of the active input.

### Example

Command/response sequence where audio input is present.

Command: 0x21 0x01 0x5A 0x01 0xF0 0x0D  
Response: 0x21 0x01 0x5A 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5A
DI	0x01
Data	0xF0 - Request input status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5A
Ac	Answer code
DI	0x01
Data	0x00 - Input not present 0x01 - Input present
Et	0x0D

### Processor mode input (0x5B)

Enable processor mode on a certain input or disable processor mode.

#### Example

Enable processor mode on the CD input:

Command: 0x21 0x01 0x5B 0x01 0x06 0x0D  
 Response: 0x21 0x01 0x5B 0x00 0x01 0x06 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5B
DI	0x01
Data	0x00 - Disable 0x02 - Aux 0x03 - PVR 0x04 - AV 0x05 - STB 0x06 - CD 0x07 - BD 0x08 - SAT 0x09 - GAME 0xF0 - Query processor mode status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5B
Ac	Answer code
DI	0x01
Data	0x00 - Disabled 0x02 - Aux 0x03 - PVR 0x04 - AV 0x05 - STB 0x06 - CD 0x07 - BD 0x08 - SAT 0x09 - GAME
Et	0x0D

### Processor mode volume (0x5C)

Set the processor mode volume

#### Example

Command/response sequence to set the processor mode volume to 45 (0x2D).

Command: 0x21 0x01 0x5C 0x01 0x2D 0x0D  
 Response: 0x21 0x01 0x5C 0x00 0x01 0x2D 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5C
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	0x5C
Ac	Answer code
DI	0x01
Data	0x00 (0)– 0x63 (99)
Et	0x0D

## System status (0x5D)

Request the system status.

### Example

Command/response sequence to request the system status.

Command: 0x21 0x01 0x5D 0x01 0xF0 0x0D

Response: 0x21 0x01 0x5D 0x00 0x01 0xF0 0x0D

### Note:

This command will return the following information about the system:

- Power state
- Brightness level
- Headphone status
- Software version
- Model Number
- Volume setting
- Mute status
- Current input source
- Headphone override status
- Balance setting
- Sample rate
- Network name
- IP address
- Timeout counter value
- Lifter temperature
- Output temperature
- Auto shutdown status
- Input detect status
- Processor mode input
- Processor mode volume
- DC offset status
- Short circuit status
- DAC Filter

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5D
DI	0x01
Data	0xF0 – Request the system
Et	0x0D

RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5D
Ac	Answer code
DI	0x01
Data	0xF0 - System status sent
Et	0x0D

### System model (0x5E)

Request the system model.

#### Example

Command/response sequence to request the system model, where the model is SA30.

Command: 0x21 0x01 0x5E 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x5E 0x00 0x04 0x53 0x41 0x33 0x30 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5E
DI	0x01
Data	0xF0 – Request the system model
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x5E
Ac	Answer code
DI	0x04
Data	System model in ASCII characters
Et	0x0D

### DAC Filter (0x61)

Sets or requests the DAC filter

#### Example

Command/response sequence to request the DAC filter where response is Linear Phase Fast Roll Off

Command: 0x21 0x01 0x61 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x61 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x61
DI	0x01
Data	0x00 - Linear Phase Fast Roll Off 0x01 - Linear Phase Slow Roll Off 0x02 - Minimum Phase Fast Roll Off 0x03 - Minimum Phase Slow Roll Off 0x04 - Brick Wall 0x05 - Corrected Phase Fast Roll Off 0x06 - Apodizing 0xF0 - Request the current filter
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x61
Ac	Answer code
DI	0x01
Data	0x00 - Linear Phase Fast Roll Off 0x01 - Linear Phase Slow Roll Off 0x02 - Minimum Phase Fast Roll Off 0x03 - Minimum Phase Slow Roll Off 0x04 - Brick Wall 0x05 - Corrected Phase Fast Roll Off 0x06 - Apodizing
Et	0x0D

## Now Playing information (0x64)

Request the various now playing track details. If the unit is currently playing from a source other than a streaming input the track name etc will returned as NULL.

### Example

Command/response sequence to request the currently playing artist where the response is A

Command: 0x21 0x01 0x64 0x01 0xF1 0x0D  
 Response: 0x21 0x01 0x64 0x00 0x02 0x41 0x0D

### Note

Response length is limited to 100 characters

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x64
Dl	0x01
Data	0xF0 - Request the currently playing track title 0xF1 - Request the currently playing artist 0xF2 - Request the currently playing album 0xF3 - Request the currently playing application (GoogleCast only) 0xF4 - Request the currently playing sample rate 0xF5 - Request the currently playing track encoder
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x64
Ac	Answer code
Dl	<n>
Data	Track: Track title in ASCII characters  Album: Album name in ASCII characters  Artist: Artist name in ASCII characters  Application: GoogleCast source application in ASCII characters  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  Audio encoder: 0x00 - Unknown 0x01 - MP3 0x02 - WMA 0x03 - Ogg Vorbis 0x04 - FLAC 0x05 - WAV 0x06 - AIFF 0x07 - RealAudio 0x08 - MPEG URL 0x09 - SCPLS 0x0A - WPL 0x0B - MP4 0x0C - DSD 0x0D - Opus 0x0E - Sirius 0x0F - MQA
Et	0x0D

### Maximum Turn On Volume (0x65)

Set or request the maximum volume level at power up of the SA30.

Response data format:

e.g. for volume 45: Data=0x2D (45)

#### Example

Command/response sequence for setting the maximum turn on volume in Zone 1 to 45:

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

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

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x65
DI	0x01
Data	0x00 (0) – 0x63 (99) – Set the maximum turn on volume 0xF0 – Request the maximum turn on volume
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x65
Ac	Answer code
DI	0x01
Data	Maximum turn on volume, integer value: 0x00 (0) – 0x63 (99)
Et	0x0D

### Maximum Volume (0x66)

Set or request the maximum volume level of the SA30. Used to prevent volume being accidentally set to full when using app volume sliders.

Response data format:

e.g. for volume 45: Data=0x2D (45)

#### Example

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

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

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

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x66
DI	0x01
Data	0x00 (0) – 0x63 (99) – Set the maximum volume 0xF0 – Request the maximum volume
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x66
Ac	Answer code
DI	0x01
Data	Maximum volume, integer value: 0x00 (0) – 0x63 (99)
Et	0x0D



## RC5 Command Codes

These codes are recognised as infra-red signals received by the front panel and as control data using the “Simulate RC5 IR command (0x08)” on page 7.

### Basic Functions

These RC5 codes are present on the supplied IR remote control and provide control over basic amplifier functions.

Function	RC5 code [system- command]	RC5 code (Data1 - Data2)
	Decimal	Hexadecimal
Standby	16-12	0x10 - 0x0C
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 Balance Control	16-37	0x10 - 0x25
0	16-0	0x10 - 0x00
Cycle between VFD information panels	16-55	0x10 - 0x37
Rewind	16-121	0x10 - 0x79
Fast Forward	16-52	0x10 - 0x34
Skip Back	16-33	0x10 - 0x21
Skip Forward	16-11	0x10 - 0x0B
Stop	16-54	0x10 - 0x36
Play	16-53	0x10 - 0x35
Pause	16-48	0x10 - 0x30
MENU (Enter system menu)	16-82	0x10 - 0x52
Navigate Up	16-86	0x10 - 0x56
Navigate Left	16-81	0x10 - 0x51
OK	16-87	0x10 - 0x57
Navigate Right	16-80	0x10 - 0x50
Audio (Room EQ on/off)	16-30	0x10 - 0x1E
Navigate Down	16-85	0x10 - 0x55
RTN (Back in menu)	16-51	0x10 - 0x33
HOME	16-43	0x10 - 0x2B
Mute	16-13	0x10 - 0x0D
Increase volume (+)	16-16	0x10 - 0x10
DISP (Change VFD brightness)	16-59	0x10 - 0x3B
Analogue DIRECT mode	16-10	0x10 - 0x0A
Decrease volume (-)	16-17	0x10 - 0x11
PHONO	16-117	0x10 - 0x75
AUX	16-99	0x10 - 0x63
NET	16-92	0x10 - 0x5C
USB	16-93	0x10 - 0x5D
AV	16-94	0x10 - 0x5E
SAT	16-27	0x10 - 0x1B
PVR	16-96	0x10 - 0x60
GAME	16-97	0x10 - 0x61
BD	16-98	0x10 - 0x62
CD	16-118	0x10 - 0x76
STB	16-100	0x10 - 0x64

### 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 amp 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
Power On	16-123	0x10 - 0x7B
Power Off	16-124	0x10 - 0x7C
Random	16-76	0x10 - 0x4C
Repeat	16-49	0x10 - 0x31
Direct mode On	16-78	0x10 - 0x4E
Direct mode Off	16-79	0x10 - 0x4F
Mute On	16-26	0x10 - 0x1A
Mute Off	16-120	0x10 - 0x78
Display Off	16-31	0x10 - 0x1F
Display L1	16-34	0x10 - 0x22
Display L2	16-35	0x10 - 0x23
Balance left	16-38	0x10 - 0x26
Balance right	16-40	0x10 - 0x28

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