

# ARCAM

## Custom Installation Notes: Serial programming interface and IR remote commands for Arcam P429



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## Applicability

This document applies to the Arcam P429 power amplifier.

### Revision history

Issue A.0:	Initial revision
Issue B.0:	Added signal sense auto shutdown control

# Controlling via RS232/NET

## Introduction

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

## Set-up

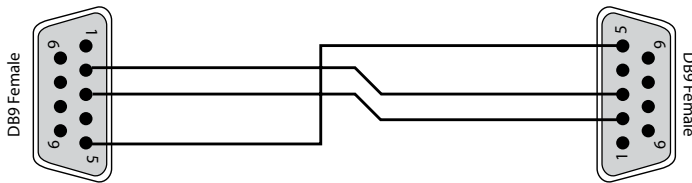
IP control is via port 50000 of the IP address of the unit.

## 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.

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## 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.

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## Command and response formats

Communication between the remote controller (RC) and the P429 takes the form of sequences of bytes, with all commands and responses having the same basic format. The P429 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 ETR
  - Data: the parameters for the command
  - Et (End transmission): 0x0D

Each response by the P429 has the following format:

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

The P429 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.
- 0x86 – Invalid data length.

## State changes as a result of other inputs

It is possible that the state of the P429 may be changed as a result of user input via the rear panel switches or by external events (i.e. a fault). 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.

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## AMX Duet™ Support

The AV 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=P429><Device-Revision=x.y.z>\r"

Where,

x.y.z = RS232 protocol version number.

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# System Command Specifications

## Power (0x00)

Set/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
DI	0x01
Data	0x00 – Power Off 0x01 – Power On 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

## Lifter temperature (0x01)

Request the temperature of the lifter for the CH1,2 or CH3,4 output:

### Example

Command/response sequence for requesting the temperature of the CH1,2 lifter where the result is 75degC:

Command: 0x21 0x01 0x01 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x01 0x00 0x02 0x00 0x4B 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x01
DI	0x01
Data	0xF0 – Request CH1,2 lifter temperature 0xF1 – Request CH3,4 lifter temperature
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x01
Ac	Answer code
DI	0x02
Data1	0x00 – CH1,2 lifter 0x01 – CH3,4 lifter
Data2	0x?? – Temperature in deg C in hex, e.g. 75degC = 4B
Et	0x0D

## Output temperature (0x02)

Request the temperature of the output for the CH1,2 or CH3,4 output.

### Example

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

Command: 0x21 0x01 0x02 0x01 0xF0 0x0D  
 Response: 0x21 0x01 0x02 0x00 0x02 0x00 0x4B 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x02
DI	0x01
Data	0xF0 – Request CH1,2 output temperature 0xF1 – Request CH3,4 output temperature
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x02
Ac	Answer code
DI	0x02
Data1	0x00 – CH1,2 output 0x01 – CH3,4 output
Data2	0x?? – Temperature in deg C in hex, e.g. 75degC = 0x4B
Et	0x0D

### DC offset (0x03)

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 0x03 0x01 0xF0 0x0D  
Response: 0x21 0x01 0x03 0x00 0x01 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x03
DI	0x01
Data	0xF0 – Request DC offset status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x03
Ac	Answer code
DI	0x01
Data	0x00 - OK 0x01 - DC offset detected
Et	0x0D

### Short circuit status (0x04)

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

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x04
DI	0x01
Data	0xF0 – Request short circuit status
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x04
Ac	Answer code
DI	0x01
Data	0x00 - No short circuit detected 0x01 - Short circuit detected
Et	0x0D

### Fan speed mode (0x05)

Set fan speed to off, low, high, auto, request fan speed mode

#### Example

Command/response sequence to set fan to auto:

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

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x05
DI	0x01
Data	0x00 - Fan off 0x01 - Auto 0x02 - Fan on (full speed) 0x03 - Fan on (low speed) 0xF0 - Request fan speed
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x05
Ac	Answer code
DI	0x01
Data	0x?? - Fan mode (off, auto, low, high)
Et	0x0D

### Amplifier mode (0x06)

Request the amplifier mode - normal, bridged, dual mono

#### Example

Command/response sequence to CH1,2 amp mode is set to normal:

Command: 0x21 0x01 0x06 0x01 0xF0 0x0D

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

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x06
DI	0x01
Data	0xF0 - Request CH1,2 amplifier mode 0xF1 - Request CH3,4 amplifier mode
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x06
Ac	Answer code
DI	0x01
Data	0x00 - CH1,2 normal (stereo) 0x01 - CH1,2 bridged 0x02 - CH1,2 dual mono 0x03 - CH3,4 normal (stereo) 0x04 - CH3,4 bridged 0x05 - CH3,4 dual mono
Et	0x0D

### Software version (0x07)

Request the firmware version

#### Example

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

Command: 0x21 0x01 0x07 0x01 0xF0 0x0D

Response: 0x21 0x01 0x07 0x00 0x02 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x07
DI	0x01
Data	0xF0 - request software version
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x07
Ac	Answer code
DI	0x02
Data1	0x?? - major version number
Data2	0x?? - minor version number
Et	0x0D

### Auto shutdown control (0x08)

Enable or disable the signal sense auto shutdown feature

#### Example

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

Command: 0x21 0x01 0x08 0x01 0x01 0x0D

Response: 0x21 0x01 0x08 0x00 0x01 0x01 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x08
DI	0x01
Data	0x00 - Disable (Default) 0x01 - Enable 0xF0 - Query
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x08
Ac	Answer code
DI	0x01
Data	0x00 - Signal sense auto shutdown disabled 0x01 - Signal sense auto shutdown enabled
Et	0x0D

### Mute/Unmute (0x09)

Set/Request the mute status of the 1,2,3,4 outputs.

#### Example

Command/response sequence for requesting the mute status of output 3 where the result is unmuted:

Command: 0x21 0x01 0x09 0x01 0xF2 0x0D  
Response: 0x21 0x01 0x09 0x00 0x01 0x02 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x09
DI	0x01
Data	0x00 - Mute CH1 0x01 - Unmute CH1 0x02 - Mute CH2 0x03 - Unmute CH2 0x04 - Mute CH3 0x05 - Unmute CH3 0x06 - Mute CH4 0x07 - Unmute CH4 0xF0 - Request mute status CH1 0xF1 - Request mute status CH2 0xF2 - Request mute status CH3 0xF3 - Request mute status CH4
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x09
Ac	Answer code
DI	0x01
Data	0x00 - CH1 muted 0x01 - CH1 unmuted 0x02 - CH2 muted 0x03 - CH2 unmuted 0x04 - CH3 muted 0x05 - CH3 unmuted 0x06 - CH4 muted 0x07 - CH4 unmuted
Et	0x0D

### Set/request friendly name (0x0A)

This command returns the friendly name of the unit. It can also be used to set the unit name.

#### Example

Command/response sequence for setting the unit name to "P429":

Command: 0x21 0x01 0x0A 0x04 0x50 0x34 0x32 0x39 0x0D  
Response: 0x21 0x01 0x0A 0x00 0x04 0x50 0x34 0x32 0x39 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	0x01
Cc	0x0A
DI	0x01 (query) or <n> (limited to 10 characters) for setting name
Data	F0 - query 1-<n>
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone Number
Cc	0x0A
Ac	Answer code
DI	Data length - <n> if setting, 0x0A if requesting the name
Data1 - Data <n>	Input name in ASCII characters
Et	0x0D



### Factory reset (0x0B)

This command resets the unit to factory defaults.

#### Example

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

Command: 0x21 0x01 0x0B 0x02 0xAA 0xAA 0x0D

Response: 0x21 0x01 0x0B 0x00 0x00 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0B
DI	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	0x0B
Ac	Answer code
DI	0x00
Et	0x0D

### Set/request IP address (0x0C)

This command sets or requests the IP address of the unit.

#### Example

Command/response sequence for setting an IP address of 192.168.1.4:

Command: 0x21 0x01 0x0C 0x04 0xC0 0xA8 0x01 0x04 0x0D

Response: 0x21 0x01 0x0C 0x00 0x04 0xC0 0xA8 0x01 0x04 0x0D

Command/response for requesting the IP address of the unit, where the IP address is 192.168.1.4:

Command: 0x21 0x01 0x0C 0x01 0xF0 0x0D

Response: 0x21 0x01 0x0C 0x00 0x04 0xC0 0xA8 0x01 0x04 0x0D

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0C
DI	0x01 (Query) or 0x04 (Set)
Data1	0xF0 (Query) or 0x?? (Set first byte of the IP address)
Data2	0x?? (Set second byte of the IP address)
Data3	0x?? (Set third byte of the IP address)
Data4	0x?? (Set fourth byte of the IP address)
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0C
Ac	Answer code
DI	0x04
Data1	0x?? (First byte of the IP address)
Data2	0x?? (Second byte of the IP address)
Data3	0x?? (Third byte of the IP address)
Data4	0x?? (Fourth byte of the IP address)
Et	0x0D

### Request timeout counter (0x0E)

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

#### Example

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

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

Response: 0x21 0x01 0x0E 0x00 0x02 0x38 0x40 0x0D

In this example, the timeout value is 0x3840, which translates to 14,400 seconds. The range of the value returned is from 0x0000 - 0x3840 (0 - 14,400seconds)

COMMAND:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
DI	0x01
Data	0xF0
Et	0x0D
RESPONSE:	
Byte:	Description:
St	0x21
Zn	Zone number
Cc	0x0E
Ac	Answer code
DI	0x02
Data1	0x?? (First byte of timeout counter)
Data2	0x?? (Second byte of timeout counter)
Et	0x0D

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