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S T E I N W A Y L Y N G D O R F

MODEL P200  
SURROUND SOUND PROCESSOR

EXTERNAL CONTROL MANUAL

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December 9, 2015

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## DOCUMENT HISTORY

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## INTRODUCTION

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The purpose of this document is to describe how the external control interface of the device works.

## HOME AUTOMATION SYSTEM INTEGRATION

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The Model P200 is compatible with home automation systems via the RS232 and network connectors on the rear socket panel. The P200's IR and trigger connections can also be programmed for use in a home automation system.

## CONTROL VIA NETWORK

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Open a TCP connection on port 84 and use the control protocol as described in this document. For control from a PC, use Telnet, Putty, or similar programs to open the TCP connection.

If you do not know the IP address of the Model P200 on your local network, the Model P200 supports Apple's Bonjour Discovery service, which must be on the computer you want to set up the Model P200 with. The software is built-in as part of the Apple OS X operating system. For Windows operating systems, the software can be found at <http://www.apple.com/support/bonjour/>

The control protocol is announced via Bonjour as the service "\_slactrl".

Pressing the "OK" button on the remote and toggling through the "Info" of the unit will also display the current IP address of the unit.

The P200 can also be controlled via the network by accessing <http://p200.local> in your browser.

## CONTROL VIA SERIAL PORT

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The serial port on the P200 is wired as a DTE, so for communication with a PC or similar, you will need a null modem adapter and gender changer.

The port settings should always be 8 data bits, no parity, one stop bit and no hardware handshake. The baud rate is 115200 bits per second. All commands and responses are in ASCII form.

When controlling the P200 via the serial port, it is able to wake up even when the standby mode has been set to "deep sleep". However, the P200 will miss the first one or two characters transmitted when in deep sleep, because it needs to wake up first. So in order to make sure the P200 is ready for the command, send a few extra characters before an ON-command. Sending for instance "!!!POWERONMAIN" to turn on the P200 will guarantee that the command is always received, even if it is in deep sleep.

# CONTROL PROTOCOL

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## Commands

Every command starts with '!' character and ends with carriage return (ascii 0x0D, referred to in this document as <CR>). There are two types of commands, commands and status requests. Commands are used to emulate remote key presses or to set a certain volume etc. Status requests are used to query the current state of the controller (volume, current source etc.). Commands with invalid format are simply ignored. For example, sending a command !VOL(100)garbage!MUTEON<CR> will only result in volume being muted, because volume command is not terminated properly.

## Responses and feedback level

There are three levels of responsiveness, called feedback levels. Each level adds something new on top of the previous level. Feedback level can be set from the control interface with command “!VERB(X)<CR>” (X can be 0, 1 or 2). All responses start either with '!' (status messages) or '#' (echo messages) and end with <CR>.

Feedback level 0: Data is only sent when data is requested by status request command. For example command “!VOL?<CR>” would return “!VOL(XXX)<CR>”, where “XXX” would be current volume.

Feedback level 1: Data is sent whenever any of the statuses listed below changes. The data format is the same as for responses to status request commands.

Feedback level 2: Each command is also echoed back with the '#' in front of the command instead of '!' character. For example command “!VOL?<CR>” would return “#VOL?<CR>!VOL(XXX)<CR>”.

Status	Related status request command
Audio input	!AUDIN?<CR>
Audio processing mode	!AUDMODE?<CR>
Audio type	!AUDTYPE?<CR>
Mute	!MUTE?<CR>
Power	!POWER?<CR>
RP Focus Position	!RPFOC?<CR>
Voicing	!RPVOI?<CR>
Source	!SRC?<CR>
Video input	!VIDIN?<CR>
Video type	!VIDTYPE?<CR>
Volume	!VOL?<CR>
Multiview layout	!MVIEW?<CR>
Multiview active window	!MVIEWACTIVE?<CR>
Multiview sources	!MVIEWSRC?<CR>
Zone power	!POWERZONE2?<CR>
Zone audio input	!ZAUDIN?<CR>
Zone source	!ZSRC?<CR>
Zone user mute	!ZMUTE?<CR>
Zone volume	!ZVOL?<CR>

Table 1 Automatic status messages

# COMMANDS

This chapter introduces all the different control protocol commands.

Command	Values	Description
!AUDMODE-		Audio processing mode down button.
!AUDMODE(X)	See list returned by !AUDMODEL?	Set audio processing mode.
!AUDMODE+		Audio processing mode up button.
!BACK		Back button.
!DIM-		Reduce brightness of front display.
!DIM(X)	0=100%, 1=75%, 2=50%, 3=25%	Set brightness of front display.
!DIM+		Increase brightness of front display.
!DIRD		Direction Down button.
!DIRL		Direction Left button.
!DIRR		Direction Right button.
!DIRU		Direction Up button.
!ENTER		Enter button.
!EXIT		Exit button.
!HDMIMAINOUT(X)	X is the number of the HDMI output (See list)	Selects which HDMI output to use for main out.
!HDMIOUT1(X)	X is the number of the HDMI-input to be used, see list.	Route HDMI input X video to HDMI output 1. Will not work for the main HDMI output.
!HDMIOUT2(X)	X is the number of the HDMI-input to be used, see list.	Route HDMI input X video to HDMI output 2. Will not work for the main HDMI output.
!HDMIOUT3(X)	X is the number of the HDMI-input to be used, see list.	Route HDMI input X video to HDMI output 3. Will not work for the main HDMI output.
!HDMIOUT4(X)	X is the number of the HDMI-input to be used, see list.	Route HDMI input X video to HDMI output 4. Will not work for the main HDMI output.
!HDMIOUT5(X)	X is the number of the HDMI-input to be used, see list.	Route HDMI input X video to HDMI output 5. Will not work for the main HDMI output.
!INFO		Info button.
!LIPSYNC-		Reduces the lipsync value. (-5ms)
!LIPSYNC(X)	Lipsync value in ms. See range returned by !LIPSYNCRANGE?	Sets the lipsync value to X.
!LIPSYNC+		Increases the lipsync value. (+5ms)
!LOUDNESS(X)	0 (off) or 1 (on)	Sets loudness status.
!MENU		Menu button.
!MULTIVIEW		Multiview button.
!MUTE		Mute toggle button.
!MUTEOFF		Mute off.
!MUTEON		Mute on.
!MVIEW(X)	0 to 5 (0 = Off, 1 to 5 = Layout)	Select multiview layout. If X is 0, multiview is turned off. If X is not 0 and multiview is off, multiview is turned on.
!MVIEWACTIVE(X)	1 to 4	Select active multiview window.
!NUM(X)	0 to 9	Numeric buttons 0-9.
!POWEROFFMAIN		Power off.

!POWEROFFZONE2		Zone 2 power off.
!POWERONMAIN		Power on.
!POWERONZONE2		Zone 2 power on.
!RPFOC-		Previous RoomPerfect position button.
!RPFOC(X)	0 = bypass 1-8 = focus1 – focus8 9 = global	Select RoomPerfect position X.
!RPFOC+		Next Roomperfect position button.
!RPVOI-		Previous voicing button.
!RPVOI(X)	See list returned by RPVOIS?	Select voicing X.
!RPVOI+		Next voicing button.
!SETUP		Setup button.
!SRC-		Previous source button.
!SRC(X)	See list returned by SRCS?	Select source X.
!SRC+		Next source button.
!SRCBTN		SRC button.
!SRCOFF-		Decrease source volume offset.
!SRCOFF(X)	-100 (-10dB) to 100 (+10dB)	Set new source volume offset for current source to X.
!SRCOFF+		Increase source volume offset
!VERB(X)	0 to 2	Set verbosity level of active interface.
!VOL-		Decrease volume. (-0.5dB)
!VOL-(X)	1 to 999 (-0.1dB to -99.9 dB)	Decrease volume by X.
!VOL(X)	-999 to 200 (-99.9dB to +20.0dB)	Set volume to X.
!VOL+		Increase volume. (+0.5dB)
!VOL+(X)	1 to 999 (+0.1dB to +99.9 dB)	Increase volume by X.
!ZMUTE		Toggle Zone 2 mute.
!ZMUTEOFF		Zone 2 mute off.
!ZMUTEON		Zone 2 mute on.
!ZSRC-		Previous zone 2 source button.
!ZSRC(X)	See list returned by ZSRCS?	Select zone 2 source X.
!ZSRC+		Next zone 2 source button.
!ZVOL-		Decrease zone 2 volume. (-0.5dB)
!ZVOL-(X)	1 to 999 (-0.1dB to -99.9 dB)	Decrease zone 2 volume by X.
!ZVOL(X)	-999 to 200 (-99.9dB to +20.0dB)	Set zone 2 volume.
!ZVOL+		Increase zone 2 volume. (+0.5dB)
!ZVOL+(X)	1 to 999 (+0.1dB to +99.9 dB)	Increase zone 2 volume by X.

## STATUS REQUESTS

Command	Return format	Values	Description
!AUDIN?	!AUDIN(X)	Index of active audio input. (See list)	Currently selected audio input.
!AUDMODE?	!AUDMODE(X) "Name"	Index and name of active audio mode.	Current audio processing mode.
!AUDMODEL?	!AUDMODECOUNT(N) !AUDMODE(0)"Name" ... !AUDMODE(N-1)"Name"	N is the total number of available modes.	List of audio processing modes. Returns a count of modes plus index and name of each mode.
!AUDTYPE?	!AUDTYPE(typestring)	String describing the audio signal.	Audio input signal type.
!DEVICE?	!DEVICE(P200)		Name of the device.
!DIM?	!DIM(X)	0 = 100%, 1 = 75%, 2 = 50%, 3 = 25%	Brightness of the VFD display.
!HDMIMAINOUT?	!HDMIMAINOUT(X)	See list of video outputs.	Active main HDMI output.
!INTERFACE?	!INTERFACE(IP) or !INTERFACE(SERIAL)		Interface for active session.
!LIPSYNC?	!LIPSYNC(X)	X is in the range returned by !LIPSYNCRANGE?	Current lipsync value.
!LIPSYNCRANGE?	!LIPSYNCRANGE(min,max)	Min and max values in ms.	Valid range for lipsync values.
!LOUDNESS?	!LOUDNESS(X)	0 (off) or 1 (on)	Loudness status.
!MUTE?	!MUTEON or !MUTEOFF		Mute status.
!MVIEW?	!MVIEW(X)	0 to 5 (0 = Off, 1 to 5 = Layout)	Multiview layout.
!MVIEWACTIVE?	!MVIEWACTIVE(X)	1 to 4	Active multiview window.
!MVIEWSRC?	!MVIEWSRC(A,B,C,D)	Numbers of the 4 sources.	Multiview sources.
!PING?	!PONG		Ping.
!POWER?	!POWER(X)	0 (standby) or 1 (on)	Power status.
!POWERZONE2?	!POWERZONE2(X)	0 (off) or 1 (on)	Zone 2 power status.
!RPFOC?	!RPFOC(X)"Name"	0=bypass 1-8=focus1 – focus8 9=global	Current RoomPerfect position.
!RPFOCS?	!RPFOCCOUNT(N) !RPFOC(index)"Name" ... !RPFOC(index)"Name"	N is the number of available positions. Index-values are not consecutive!	List of RoomPerfect-positions. Returns a count of positions plus index and name of each position.
!RPVOI?	!RPVOI(X)"Name"	X is from the list returned by RPVOIS?	Active voicing.
!RPVOIS?	!RPVOICOUNT(N) !RPVOI(0)"Name" ... !RPVOI(N-1)"Name"	N is the total number of available voicings.	List of available voicings. Returns a count of voicings plus index and name of each voicing.

!SRC?	!SRC(X)"Name"	Number and name of source.	Active source.
!SRC(X)?	!SRC(X)"Name"	Name of source X.	Info for source X.
!SRCOFF?	!SRCOFF(X)	-100 (-10dB) to 100 (+10dB)	Source volume offset for current source.
!SRCS?	!SRCCOUNT(N) !SRC(0)"Name" ... !SRC(N-1)"Name"	N is the number of available sources.	List of available sources. Returns a count of sources plus index and name of each source.
!VERB?	!VERB(X)	0 to 2	Verbosity level of active interface.
!VIDIN?	!VIDIN(X)	Index of active video input. (See list)	Currently selected videoinput.
!VIDTYPE?	!VIDTYPE(typestring)	String describing the video signal.	Video input signal type.
!VOL?	!VOL(X)	-999 to 200 (-99.9dB to +20.0dB)	Current volume.
!ZAUDIN?	!ZAUDIN(X)	Index of active audio input. (See list)	Currently selected zone 2 audio input.
!ZMUTE?	!ZMUTEON or !ZMUTEOFF		Zone 2 mute status.
!ZSRC?	!ZSRC(X)"Name"	Number and name of source.	Active zone 2 source.
!ZSRC(X)?	!ZSRC(X)"Name"	Name of source X.	Info about zone 2 source X
!ZSRCS?	!ZSRCCOUNT(N) !ZSRC(X)"Name" Repeated for all zone B sources	N is the number of available sources.	List of available Zone 2 sources. Returns a count of sources plus index and name of each source.
!ZVOL?	!ZVOL(X)	-999 to 200 (-99.9dB to +20.0dB)	Current zone 2 volume.

# CONTROL PROTOCOL USAGE

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## Controlling power

Main zone and zone 2 power can be controlled separately with commands **!POWERONMAIN<CR>**, **!POWEROFFMAIN<CR>**, **!POWERONZONE2<CR>** and **!POWEROFFZONE2<CR>**.

Command **!POWER?<CR>** is used to get the current power status of the main zone. The response for this command is **!POWER(X)<CR>**, where the **X** is 0 or 1, where 0 means the main zone is off and 1 means it is on.

Command **!POWERZONE2?<CR>** is used to get the current power status of the main zone. The response for this command is **!POWERZONE2(X)<CR>**, where the **X** is 0 or 1, where 0 means zone 2 is off and 1 means it is on.

## Controlling volume

Commands **!VOL+<CR>** and **!VOL-<CR>** have the same effect as pressing volume up/down buttons from the IR remote control.

Commands **!VOL+(X)<CR>** and **!VOL-(X)<CR>** are used to increase or decrease volume by certain amount. The **X** in the commands can be anything between 1 and 999 (0.1dB – 99.9dB).

Command **!VOL(X)<CR>** is used to set the volume to some specific value. The **X** in the command can be -999 – 200 (-99.9dB – 20.0dB).

Commands **!MUTEON<CR>**, **!MUTEOFF<CR>** and **!MUTE<CR>** are used to set mute, clear mute and toggle mute respectively.

Command **!VOL?<CR>** is used to get the current value of the main zone volume. The response for this command is **!VOL(X)<CR>**, where **X** can be -999 – 200 (-99.9dB – 20.0dB). Please note that if verbosity level 1 or higher is used, volume information will be updated to the control interface automatically. There is always at least 100ms time period between the volume status messages. This period is used not to flood the control interface with too frequent volume updates every time volume is being adjusted.

Commands **!ZVOL+<CR>**, **!ZVOL-<CR>**, **!ZVOL+(X)<CR>**, **!ZVOL-(X)<CR>**, **!ZVOL(X)<CR>**, **!ZVOL?<CR>**, **!ZMUTEON<CR>**, **!ZMUTEOFF<CR>** and **!ZMUTE<CR>** are used to control zone 2 volume the same way as main zone volume.

Please note that the volume value in control protocol commands is always in 0.1dB accuracy, meaning that 1.0dB is a value of 10 in the control protocol. This is true for volume status messages and volume control commands.

**Warning:** Usage of maximum volume setting is highly recommended to prevent damage to equipment because of too loud volume setting! It is never possible to set the volume above the maximum volume level setting with control interface commands, but it is very easy to accidentally reach the maximum volume level.

## Controlling sources

### Main zone:

A source is a combination of video input and audio input that can be selected freely from the user interface. The number and names of sources can vary depending on how many sources have been created when setting up the system. The installer can add, delete, edit and re-order the sources at any time.

Command **!SRCS?<CR>** is used to find out how many sources there are and what are their names. For example a response for **!SRCS<CR>** could be:

```
!SRCCOUNT(4)<CR>  
!SRC(0)"DVD player"<CR>  
!SRC(1)"Blu-ray player"<CR>  
!SRC(2)"Game console"<CR>  
!SRC(3)"PVR"<CR>
```

It can be seen from the response that there are 4 sources, named "DVD player", "Blu-ray player", "Game console" and "PVR".

Command **!SRC?<CR>** is used to find out which source is currently selected. The response for this command is **!SRC(X)"NAME"<CR>** where **X** is the index of the currently selected source (0 is the first index) and **NAME** is the name of the currently selected source.

Commands **!SRC+<CR>** and **!SRC-<CR>** are used to select next or previous source. Command **!SRC(X)<CR>** is used to select a specific source. The **X** in the command can be anything between 0 and the index of the last source. This response is also send automatically, when the source changes, if feedback level is 1 or higher. If main zone is off, the P200 will reply with the previous selected source.

### Zone 2:

Sources on zone2 are a subset of the sources set up for main zone. Command **!ZSRCS?<CR>** is used to find out the indexes and names of the zone sources. For example a response for

```
!ZSRCS?<CR> could be:  
!ZSRCCOUNT(5)  
!ZSRC(0)"Follow Main"<CR>  
!ZSRC(1)"CD player"<CR>  
!ZSRC(2)"SACD player"<CR>
```

**!ZSRC(3)"MP3 player"<CR>**

**!ZSRC(4)"TV Sound"<CR>**

It can be seen from the response that there are 5 zone 2 sources named "Follow Main", "CD player", "SACD player", "MP3 player" and "TV Sound". "Follow Main" is a special source, which is always present. It will send the sound from whichever source is selected in the main zone to zone 2.

Command **!ZSRC?<CR>** is used to find out which zone 2 source is currently selected. The response for this command is **!ZSRC(X)"NAME"<CR>** where **X** is the index of the currently selected source (0 is the first index) and **NAME** is the name of the currently selected source. This response is also send automatically, when the zone 2 source changes, if feedback level is 1 or higher. If zone 2 is turned off, the P200 will reply with the previous selected source.

Commands **!ZSRC+<CR>** and **!ZSRC-<CR>** are used to select next or previous source. Command **!ZSRC(X)<CR>** is used to select a specific source. The **X** in the command can be anything between 0 and the index of the last source.

## **Controlling processing modes**

The P200 processor has controls for selecting processing modes, also called audio modes.

Command **!AUDMODEL?<CR>** can be used to get a list of processing modes; how many are there and what are their names. For example a response for command **!AUDMODEL?<CR>** could be:

**!AUDMODECOUNT(8)**

**!AUDMODE(0)"None"<CR>**

**!AUDMODE(1)"dts Neo:X Cinema"<CR>**

**!AUDMODE(2)"dts Neo:X Music"<CR>**

**!AUDMODE(3)"dts Neo:X Game"<CR>**

**!AUDMODE(4)"Auro-3D/Auromatic"<CR>**

**!AUDMODE(5)"Dolby Upmixer"<CR>**

**!AUDMODE(6)"Stereo"<CR>**

**!AUDMODE(7)"Party"<CR>**

Commands **!AUDMODE+<CR>** and **!AUDMODE-<CR>** are used to select next and previous audio mode from the list of available audio modes.

Command **!AUDMODE(X)<CR>** is used to select a specific processing mode, where **X** is an audio mode index as seen in the reply above.

Command **!AUDMODEL?<CR>** is used to find out which processing mode is currently selected. The response for this command is **!AUDMODE(X)"Name"<CR>**, where **X** is the index of the audio mode and **Name** is the name of the audio mode. This response is send automatically, when the audio mode changes, if feedback level is 1 or higher.

## Controlling focus positions

Command **!RPFOCS?<CR>** is used to get the list of selectable focus positions along with their names. For example a response for **!RPFOCS<CR>** could be:

```
!RPFOCCOUNT(4) <CR>  
!RPFOC(1)"Focus 1" <CR>  
!RPFOC(2)"Focus 2" <CR>  
!RPFOC(4)"Focus 4" <CR>  
!RPFOC(9)"Global" <CR>
```

It can be seen from the response that there are 4 RoomPerfect positions, named "Focus 1", "Focus 2", "Focus 4" and "Global". Note that the numbering of the positions is not consecutive.

Command **!RPFOC?<CR>** is used to find out which position is currently selected. The response for this command is **!RPFOC(X)"NAME"<CR>** where **X** is the index of the currently selected position (a value between 0 and 9) and **NAME** is the name of the currently selected position. This response is sent automatically whenever the position is changed if feedback level is 1 or higher.

Commands **!RPFOC+<CR>** and **!RPFOC-<CR>** are used to select next or previous position.

Command **!RPFOC(X)<CR>** is used to select a specific position. The **X** in the command can be any index from the list of measured focus positions retrieved by using command **!RPFOCS?<CR>**.

The installer might add or remove focus positions at any time so it is recommended to update the list of selectable focus positions at least in every boot-up.

## Controlling voicings

Command **!RPVOIS?<CR>** is used to find out the list of selectable voicings along with their names.

For example a response for **!RPVOIS<CR>** is:

```
!RPVOICOUNT(7)<CR>  
!RPVOI(0)"Neutral" <CR>  
!RPVOI(1)"Music" <CR>  
!RPVOI(2)"Music II" <CR>  
!RPVOI(3)"Relaxed" <CR>  
!RPVOI(4)"Tilt" <CR>  
!RPVOI(5)"Action" <CR>  
!RPVOI(6)"Action+Movie" <CR>
```

It can be seen from the response that there are 7 voicings, named "Neutral", "Music", "Music II", "Relaxed", "Tilt", "Action" and "Action+Movie".

Command **!RPVOI?<CR>** is used to find out which voicing is currently selected. The response for this command is **!RPVOI(X)"NAME"<CR>** where **X** is the index of the currently selected voicing (0 is the

first index) and **NAME** is the name of the currently selected voicing. This response is sent automatically whenever the current voicing is changed if feedback level is 1 or higher.

Commands **!RPVOI+<CR>** and **!RPVOI-<CR>** are used to select next or previous voicing. Command **!RPVOI(X)<CR>** is used to select a specific source. The **X** in the command can be any index from the list of voicings.

### Controlling lipsync

Command **!LIPSYNC?<CR>** is used to find out the current value of the lipsync trim. The response for this command is **!LIPSYNC(X)<CR>** where **X** is the current lipsync trim in milliseconds.

Commands **!LIPSYNC+<CR>** and **!LIPSYNC-<CR>** are used to adjust the lipsync trim value by 5ms or -5ms respectively. Command **!LIPSYNC(X)<CR>** is used to set the lipsync trim directly. The valid value range for this command needs to be fetched from the P200 (see below).

Please note that the valid range to adjust the lipsync delay is retrieved with the **!LIPSYNCRANGE?** command, returning minimum and maximum value in ms.

### Getting main zone video and audio status

It is possible to find out currently selected source's video and audio input and current video and audio format in main zone.

Command **!VIDIN?<CR>** is used to find out the used video input of currently selected source. The response for this command is **!VIDIN(X)<CR>**, where **X** is the current video. See table of video inputs for the translation of the number to actual video input. This response is sent automatically whenever input selection changes if feedback level is 1 or higher.

Command **!AUDIN?<CR>** is used to find out the used audio input of currently selected source. The response for this command is **!AUDIN(X)<CR>**, where **X** is the current audio input. See table of audio inputs for the translation of the number to actual audio input. This response is sent automatically whenever input selection changes if feedback level is 1 or higher.

Command **!VIDTYPE?<CR>** is used to find out the current video input format. The response for this command is **!VIDTYPE(Typestring)<CR>**, where **Typestring** is a string describing the current video format. This response is sent automatically whenever input signal changes if feedback level is 1 or higher.

Command **!AUDTYPE?<CR>** is used to get information about the current audio signal type. The response for that command is **!AUDTYPE(Typestring)<CR>**, where **Typestring** is a string describing the current input audio type. This response is sent automatically whenever input signal changes if feedback level is 1 or higher.

## Getting zone 2 audio status

It is possible to request the currently selected zone source's audio input in zone 2.

Command **!ZAUDIN?<CR>** is used to find out the used audio input of currently selected zone source. The response for this command is **!ZAUDIN(X)<CR>**, where **X** is the current zone 2 audio input. See table of audio inputs for the translation of the number to actual audio input. This response is sent automatically whenever input selection changes if feedback level is 1 or higher.

## Controlling feedback level

It is possible to set the feedback level from the external control interface with command **!VERB(X)<CR>**, where **X** is the wanted feedback level 0, 1 or 2.

## Controlling OSD and OSD menu

There are two On Screen Display menus in the P200 controller. The Installer menu is intended to be used by the installer and that menu should not be offered to the end user. The user menu (titled "Menu") is intended for the daily use of the user. When using a well-designed control interface, it should not be necessary for the user to access the OSD menu. It is, however, possible to access and use both of these menus by using the control interface.

Command **!MENU<CR>** is used to enter the "user menu".

Command **!ENTER<CR>** does the same as the "Ok" button in the installer IR remote.

Commands **!DIRU<CR>**, **!DIRD<CR>**, **!DIRL<CR>**, **!DIRR<CR>** and **!BACK<CR>** have the same effect as the similar buttons in the installer IR remote.

Please note that there is no way for the control interface to know whether the system is in OSD menu or not. In normal operation there should be no need for the user to access the On Screen Menu when using a dedicated control interface.

## Direct controlling of HDMI outputs

It is possible to control the HDMI outputs of the P200 controller directly using special control interface commands. The controlling allows routing of any HDMI input directly to either one of the HDMI outputs in bypass mode. Bypass mode means that there is no On Screen Display possibility. These commands are not available for the HDMI output currently used as the main output. For selecting what is shown on the main output, please use the source-commands.

The commands **!HDMIOUT1(X)**, **!HDMIOUT2(X)**, **!HDMIOUT3(X)**, **!HDMIOUT4(X)**, **!HDMIOUT5(X)** are used for selecting which input is shown on each output, where **X** is the number of the input, see the list of video inputs for the values.

## Control of main HDMI output

The main HDMI output is controlled by using the source-commands. But there are two additional functions to use for the main output.

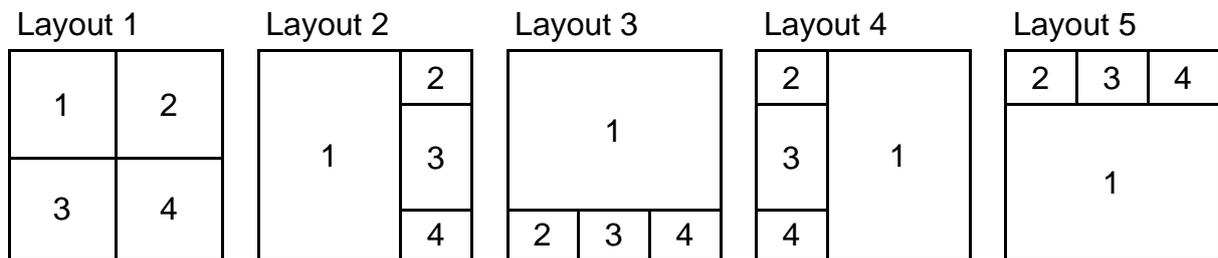
The command **!HDMIMAINOUT(X)** can be used to select which HDMI output is used for the main output. For possible values see the table of video outputs. Note that one of the available outputs is the “Video Wall” option, so this command can be used to enable or disable the video wall. To request the current value, use the command **!HDMIMAINOUT(X)**. This can be used to fetch the old value before switching to video wall mode, so it can be stored for restoring the old setting.

### Controlling multiview

The command **!MULTIVIEW** will do the same as the “PiP” button on the remote. Once multiview has been enabled it can be controlled with the commands for direction-buttons etc.

Multiview can also be controlled more directly. The **!MVIEW(X)** command will directly select the layout of multiview. If a non-zero X-value is send while multiview is off, multiview will be turned on with layout X active. Sending X=0 will turn off multiview.

The command **!MVIEWACTIVE(X)** will set window X as the active multiview window. Once a window is active, normal source-selection etc. will affect this window.



## AUDIO INPUTS

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No.	Audio Input
0	None
1	HDMI
2	8 Channel Analog
3	Spdif 1 (Optical)
4	Spdif 2 (Optical)
5	Spdif 3 (Optical)
6	Spdif 4 (Optical)
7	Spdif 5 (AES)
8	Spdif 6 (Coax)
9	Spdif 7 (Coax)
10	Spdif 8 (Coax)
11	Internal Player
12	USB
13	Analog 1 (Unbalanced)
14	Analog 2 (Unbalanced)
15	Analog 3 (Unbalanced)
16	Analog 4 (Unbalanced)
17	Analog 5 (Balanced)
18	(Reserved, do not use)
19	(Reserved, do not use)
20	16-Channel Input
21	Audio Return Channel

## VIDEO INPUTS

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No.	Video Input
0	None
1	HDMI 1
2	HDMI 2
3	HDMI 3
4	HDMI 4
5	HDMI 5
6	HDMI 6
7	HDMI 7
8	HDMI 8
9	Internal

## VIDEO OUTPUTS

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No.	Video Output
0	None
1	HDMI Out 1
2	HDMI Out 2
3	HDMI Out 3
4	HDMI Out 4
5	HDBT Out
6	(Reserved, do not use)
7	Video Wall

# IR CODES

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## NEC Protocol

Description	Value
0	0x37CA, 0x00FF
1	0x37CA, 0x01FE
2	0x37CA, 0x02FD
3	0x37CA, 0x03FC
4	0x37CA, 0x04FB
5	0x37CA, 0x05FA
6	0x37CA, 0x06F9
7	0x37CA, 0x07F8
8	0x37CA, 0x08F7
9	0x37CA, 0x09F6
Audio	0x37CA, 0x0AF5
Setup	0x37CA, 0x0BF4
Power	0x37CA, 0x0CF3
PiP	0x37CA, 0x0DF2
Previous	0x37CA, 0x0EF1
Play_Pause	0x37CA, 0x0FF0
Next	0x37CA, 0x10EF
Up	0x37CA, 0x11EE
Left	0x37CA, 0x12ED
OK	0x37CA, 0x13EC
Right	0x37CA, 0x14EB
Down	0x37CA, 0x15EA
Back	0x37CA, 0x16E9
Menu	0x37CA, 0x17E8
SRC	0x37CA, 0x18E7
Vol+	0x37CA, 0x19E6
SRC+	0x37CA, 0x1AE5
Vol-	0x37CA, 0x1BE4
Mute	0x37CA, 0x1CE3
SRC-	0x37CA, 0x1DE2

## RS232 pinout diagram

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