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User manual for the set-up and operation of the DA7210/11 evaluation board and control software

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1 Introduction

The DA7210/11 evaluation board has been produced to allow measurement, evaluation and programming of the DA7210/11 ultra-low power audio codec evaluation board and control software. The evaluation PCB is supplied together with a DVD ROM containing documentation and driver files.

The driver software uses a simple graphical user interface (GUI), allowing the DA7210/11 device to be controlled via a USB port of a PC. An additional GUI is available to control the highly configurable filter paths within the DA7210/11; including general purpose, five-band equaliser and high pass filters

The board has a number of jumper links to allow configuration of the board and to provide measurement test points.



Figure 1 DA7210/11 Block Diagram

The accompanying software requires a PC operating Windows 2000/XP with a USB1.1 or USB2 interface. The software will run under Vista if the default installation location is changed to 'C:\Dialog Semiconductor\'

The DA7210/11 device plus the USB Interface consume approximately 5mA in the standby state. The evaluation board and software are not guaranteed to operate in a USB hub. See the section on Power Supplies below.

The control software permits configuration of the device using either pre-prepared templates or individual write and read operations to all control registers

2 Hardware

There are three options available when using the DA7210/11 evaluation mainboard, Figure 2:

1. A miniboard containing the DA7210 in a CSP 49-pin package connected to evaluation board 44-179-93-02-C via jumpers J28, J30, J36 and J38, Figure 3. This board can also be used standalone or in conjunction with a customer development system.

- 2. A miniboard containing the DA7211-00 in a 36-pin CSP package connected to evaluation board 44-179-93-02-B via jumpers J28, J30, J36 and J38, Figure 4. This board can also be used standalone or in conjunction with a customer development system.
- 3. A miniboard containing the DA7211-01 in a 36-pin CSP package connected to evaluation board 44-179-93-02-E via jumpers J28, J30, J36 and J38,. This board can also be used standalone or in conjunction with a customer development system.

A USB-I2C bridge is used for communication with the device, and there are number of external active components to reduce the requirement for external equipment.



Figure 2 Evaluation Board 44-179-93-02-C Mainboard



Figure 3 DA7210 44-179-93-04-C Miniboard







Figure 5 DA7211-01 44-179-93-04-E Miniboard

The passive components needed for noise decoupling or charge pump operation have been placed as close as possible to the DUT pins to ensure optimum operational performance.

Gerber data for the board is available on request.

2.1 Power Supplies

The board is intended to be supplied by power supplies in the range $+1.8V_{dc}$ to $+2.5V_{dc}$ (nominal). The power supplies are connected via 4mm sockets: AVDD, VDDCP, VDDDAC, VDDADC, VDDDIO, DGND and AGND. LEDs D1 to D6 will illuminate when the power supplies are correctly connected.

Some devices on the board will be powered from the $+5V_{dc}$ or $+3.3V_{dc}$ supply produced by the USB interface module.

For demonstration purposes the $+5V_{dc}$ USB supply can be connected to regulator, U9, to produce $+1.8V_{dc}$ capable of supplying all of the DUT the power supply pins. This configuration allows complete DUT operation using just USB and TOSLINK connections only, but maximum headphone power output will be limited when using +1.8V VDDDCP power supply.

2.2 Jumpers and Link Positions

Header	Link Position	Function	Notes	
J5		OUT1_L speaker connection	External connection	
J6		OUT1_R speaker connection	External connection	
10	On	OUT1_L 32Ω load selected		
78	Off	OUT1_L no load		
10	On	OUT1_R 32Ω load selected		
19	Off	OUT1_R no load		
J10		MIC_L differential connection	External connection	
110	On	MICN_L single-ended input		
JIZ	Off	MICN_L differential input		
11.0	On	OUT1N_L differential output		
118	Off	OUT1N_L single-ended output		
110	On	OUT1N_R differential output		
119	Off	OUT1N_R single-ended output		
J23		MIC_R differential connection	External connection	
105	On	MIC_R single-ended input		
J25	Off	MIC_R differential input		
100	Short link	Short VDDADC current measurement point		
JZO	DMM link VDDADC current measurement point			
107	Short link	Short VDDDAC current measurement point		
JZ/	DMM link	VDDDAC current measurement point	N/A IOI DA7211	
100	On	Headphone sense ground connected	Should be disconnected	
J29	Off	Headphone sense ground disconnected	for DA7211	
101	1-2	HPL 16Ω load selected		
J31	2-3	HPL 32Ω load selected		
J32	Short link	Short AVDD current measurement point		

	DMM link					
125	1-2	HPR 16 Ω load selected				
130	2-3	HPR 32Ω load selected				
107	Short link	Short VDDCP current measurement point				
557	DMM link	VDDCP current measurement point				
120	Short link	Short XVDDD current measurement point	N/A for $DA7211$			
129	DMM link	XVDDD current measurement point				
141	Short link	Short VDDDIO current measurement point	N/A for $DA7011$			
J4 I	DMM	VDDDIO current measurement point	N/A IOI DA7211			
140	On	WCLK slave mode				
J42	Off	WCLK master mode				
140	On	CLK slave mode				
J43	Off	CLK master mode				
	1-2 / 1-2	16-bit I2S mode				
J44 /	1-2 / 2-3	24-bit I2S mode	J44 and J47 must both be set for correct			
J47	2-3 / 1-2	24-bit left justified mode	S/PDIF receiver DAI format and word length			
	2-3 / 2-3	16-bit right justified mode				
145	1-2	DAI input level shift enable				
545	2-3	DAI input level shift high impedance				
146	1-2	DAI output level shift enable				
J40	2-3	DAI output level shift high impedance				
140	On	S/PDIF receiver +5V supply enabled				
J40	Off	S/PDIF receiver +5V supply disabled				
	1-2	SPDIF word clock				
140	3-4	SPDIF bit clock	Short links only if no			
J49	5-6	SPDIF data	to J52			
	7-8	SPDIF master clock	1			

	1-2	MCLK output			
	3-4	CLK output			
J50	5-6	DATOUT output	External connections		
	7-8	WCLK output			
	11-12	SO output			
151	On	Control interface 2-wire ISK selected	Short only if J55 links		
J21	Off	Control interface 2-wire ISK de-selected	are removed		
	1-2	DAI MCLK input			
150	3-4	DAI CLK input	Short only if J49 links		
J22	5-6	DAI DATIN input	are removed		
	7-8	DAI WCLK input			
150	On	Control interface 2-wire SO selected	Short only if J55 links		
103	Off	Control interface 2-wire SO de-selected	removed		
	1-2	Control interface 4-wire nCS selected			
J55	3-4	Control interface 4-wire SI de-selected	Short only if J51 and J53 links removed		
	5-6	Control interface 4-wire ISK selected			
IEC	On	XVDDD connected to VDDCP			
100	Off	XVDDD disconnected from VDDCP			
157	On	XVDDD connected to VDDDIO			
JD7	Off	XVDDD disconnected from VDDDIO			
150	On	VDDCP connected to AVDD			
109	Off	VDDCP disconnected from AVDD			
160	On	REG_+1.8V supply connected			
JOU	Off	REG_+1.8V disconnected			

Table 1 Jumpers and Link Positions

The evaluation board can be set up to run solely from the +5V USB supply as the source for all board supplies. It is necessary to remove all external power supplies and to add jumpers J56, J57, J59 and J60 for this operation, which is the default configuration for the board.

The digital audio interface jumpers are set to receive a TOSLINK input and should be removed to accept other external clocks at J52. Figure 9 shows the extra links required to enable the onboard supplies.







Figure 7 DA7211-00 Default Link Locations



Figure 8 DA7211-01 Default Link Locations

Figure 9 shows the locations of the jumper links when using the DA7210 with external power supplies to AVDD J66, VDDCP J17, XVDDD J62 and VDDDIO J64. The digital audio interface jumpers are set to receive a TOSLINK input and should be removed to accept other external I2S clocks at J52.



Figure 9 External Power Supply Jumper Configuration

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3 Evaluation Board Features

3.1 USB Interface

The USB Interface is used here for the following purposes:

- As a source of I2C and SPI control signals.
- To provide a discrete signal to the power down pin *PD* (DA7210 only).
- To provide level shifting voltages.
- To allow standalone operation of the evaluation board using the $+5V_{dc}$ USB power supply only.

The USB control signal device is powered by the USB bus cable via a fixed $+3.3V_{dc}$ regulator.

The USB interface control signals can be isolated from rest of the evaluation board by removing J51, J53 and J55 described in Table 1. Removing these jumpers will allow external signal access to the DA7210 control interface. The USB interface can also be used to supply the power supplies to the DUT on the evaluation board.

The USB Interface implements multi-mastering on its I2C interface, permitting concurrent operation with any other multi-mastering controller. This allows the software to control a DA7210/11 device which is already part of the users system, and under control of the system processor.

4 Control Software

4.1 Installation

Insert the DVD-ROM containing the software into the controlling PC. If the installation does not start automatically, run the program 'setup.exe' from the DVD-ROM containing the software. An automated script will install the program to your PC. By default, the directory 'C:\ProgramFiles\Dialog Semiconductor\Audio\DA7210 Rev x.x' will be used.

As Windows Vista imposes limitiations on the 'C:\Program Files' directory, change this default to 'C:\Dialog Semiconductor\Audio\DA7210 Rev x.x' when prompted.

Plug in the USB cable, and Windows will detect the USB device. It will prompt for the drivers, which should be automatically located on the root directory of the DVD-ROM. The setup file is *''dlgezusb.inf'* and the following description explains how to install the driver.



Select No, not this time and press Next >



Select Install from a list or specific location (Advanced) and press Next >

Found New Hardware Wizard
Please choose your search and installation options.
O Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
✓ Include this location in the search:
C:\Program Files\Dialog Semiconductor\Audio\DA7 🗸 🖪 Browse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< <u>B</u> ack <u>N</u> ext > Cancel

Select Browse and locate the folder C:\Program Files\Dialog Semiconductor\Audio\DA7210_11 Rev x.x

Found New Hardware Wizard											
Please select the best match for your hardware from the list below.											
	÷	Cypress EZ-USB FX2 (68613) - EEPRO	d missin <u>c</u>)							
	Descri	ption	V	ersion	Manufacturer						
	Сур	ress EZ-USB FX2 (68613) - EEPROM mis	sing U	nknown	Dialog Semicondu						
	Сур	ress EZ-USB FX2 (68613) - EEPROM mis	ising Ui	nknown	Dialog Semicondu						
	<				>						
	<u> </u>	s driver is not digitally signed! me why driver signing is important									
		_<	<u>B</u> ack	<u>N</u> e	ext > Can	cel					

Select dlgezusb.inf and press Next >



Press Continue Anyway

Files Ne	eded	×
	The file 'ezusb.sys' on (Unknown) is needed.	ОК
	Type the path where the file is located, and then click OK.	Cancel
	Copy files from:	Browse

Select Browse and locate C:\Program Files\Dialog Semiconductor\Audio\DA7210_11 Rev x.x then press OK



Select Finish

If you are using Windows XP, you may get a message saying that a USB2 device is attached to a USB1.1 port. This can safely be ignored.

To uninstall the software please use the Windows 'Add/Remove Programs' function that can be found under 'Start->Settings->Control Panel'.

4.2 Set-up Files

4.2.1 Text File

The DUT registers can written to by submitting a text file containing the register values; Figure 10 shows an example file. Only the data in the first three columns is required: register, data, R/W; other comments, such as those shown in the example, will be ignored. Lines of text that do not follow register write entries should be preceded by // in order that the line is ignored when reading the text file.

The text file can be created by saving the first three columns of the template spreadsheet file above as a text file or can be created from scratch; it is only necessary for the text file to contain the registers required for set up all others can be omitted.

To add a delay in the file the register value is entered as *Delay* followed by the delay time require in milliseconds. The example in Figure 10 shows a 100ms delay added as the third entry.

DAC_H	HPLR CI	ass G.txt - No	tepad 🔶	
<u>F</u> ile <u>E</u> dit	F <u>o</u> rmat	⊻iew <u>H</u> elp		
//DACL/ //Reg 00 01 02 Delay 04 05 06 07 08 00 00 00 00 00 00 00 00 10 11 12 13 14 15 16 17	<pre>(R to H Data 00 07 00 100 00 00 00 00 00 00 00 00 00 00 00</pre>	HPL/R Class R/W 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	G Mode Function PAGE0 CONTROL STATUS STARTUP2 STARTUP3 RESERVED MIC_L MIC_L MIC_R AUX1_L AUX1_L AUX1_R AUX1_L AUX1_R AUX2 IN_GAIN INMIX_L INMIX_L INMIX_L INMIX_R ADC_HPF ADC ADC_EQ1_2 ADC_EQ3_4 ADC_EQ3_4 ADC_EQ3_4 ADC_HPF DAC_L DAC_R DAC_SEL	
<		1111		>

Figure 10 Text Set-up File

A selection of text files can be found on the DVD containing the register control software setup files.

4.2.2 Spreadsheet File

The register settings can be prepared using a spreadsheet file template provided, Figure 11, and saved as a tab delimited text file like Figure 10. The only bits that can be altered on the spreadsheet are the individual register bits in columns G to N and the R/W bit in column O. If any of these bits are set to 1 the bit will be highlighted in green on the register map. If the bit default setting is 1 and the bit value is changed to 0 then the register map bit will be highlighted in grey. This highlighting allows easy visual reference to the register changes from the default settings.



Figure 11 Spreadsheet Set-up File

4.3 Control Panels

Run the DA7210/11 program by clicking the shortcut on the appropriate item in the Start menu. The best setting for the PC display size is 1024x768 pixels or above. Font size on the PC display should be Normal (95dpi). It is important to note that a display size other than the recommended setting may affect the way in which the panels appear.

4.3.1 Front Panel

The front panel allows selection of a number of methods for programming the registers of the DUT.

- Submit a text file template, which allows register sequencing and time delays to be added.
- Select register map page 0 for individual register read/write access.
- Select register map page 1 for individual register write access.
- Select general purpose filters register map for individual register write access.
- Open a panel to access the volume control registers for real time volume control.
- Direct read/write access to a single register.

DA7210/11 Rev 2.3 - Control Panel Selection	→								
Register Map Page 0 Set device page 0 registers	Register								
Register Map Page 1 Set device page 1 registers	Setting								
Filter Coefficients Set filter coefficient registers	R/W Select Write								
Volume Controls Volume Controls	Submit								
Submit register settings from text file									
File Submit .txt Save present register settings to spreadsheet									
File Save .xls									
Reset all registers to default values									
2-wire Control Interface Mode									
Enabled Powerdown									

Figure 12 Front Panel

Any file path required can be opened using the '...' button to the right of the corresponding text box, but it must then be submitted or saved using the submit button to the left of the corresponding text box.

It is possible to save the present register settings by selecting a spreadsheet file by locating the filename path using the '*Save present register setting to spreadsheet*' box. This function will not read back the device registers, but will only output the values shown on Page 0 and Page 1 of the GUI.

The front panel also contains a reset button, a device power down button and 2-wire/4-wire control selection.

4.3.2 Register Map Page 0

The page 0 register map panel allows read/write access to single bits or to the hex value of a single register; both can be submitted individually.

🐱 Regis	C Register Map Page 0												
Register	R/W	87 86 85 84 83 82 81 80 Hex	Submit	FUNCTION	7	6	5	4	3	2	1	0	DEFAULT
0x00	W	0 0 0 0 0 0 0 0 0		PAGE0	REG PAGE								0
0x01	W	0 0 0 1 0 0 0 10		CONTROL	WRITE_MODE		ATB1_LEV	ATB1_SEL	NOISE_SUP	BIAS_EN	VDDIO_RANGE	REG_EN	10000
0x02	B	0 0 0 0 0 0 0 0 0		STATUS					MUTING	SOFTMUTED	128_LOCK	PLL_LOCK	0
0x03	W	0 0 0 0 0 0 0 0 0		STARTUP1	SC_CLK_DIS			SC_OVERRIDE				SC_MST_EN	0
0x04	W	0 0 0 0 0 0 0 0 0	1.0	STARTUP2		STARTUP2[6:0]						0	
0x05	W	0 0 0 0 0 0 0 0 0	-	STARTUP3				ST	ARTUPS[6:0]				0
0x06	W	0 0 0 0 0 0 0 0 0	-	RESERVED				RESERVED					0
0x07	W	0 0 0 0 0 0 0 0 0		MIC L	MIC L EN	MICBIAS EN	MICBIAS	SEL[1:0]	MIC L MUTE		MIC L VOL[2:0]		0
0x08	W	0 0 0 0 0 0 0 0 0		MIC_R	MIC_R_EN				MIC_R_MUTE		MIC_R_VOL[2:0]		0
0x09	W	0 0 0 1 0 0 0 0 10	14	AUX1_L	AUX1_L_EN				AUX1_L_V	OL[6:0]			10000
Ox0A	W	0 0 0 1 0 0 0 0 10	1.00	AUX1_R	AUX1_R_EN				AUX1_R_V	OL[5:0]			10000
0x0B	W	0 0 0 0 0 0 0 0 0		AUX2					AUX2_EN	AUX2_MUTE	AUX2_VC	DL[1:0]	0
0x0C	W	0 0 0 0 0 0 0 0 0	1.0	IN_GAIN		INPGA_R_VOL[3:0] INPGA_L_VOL[3:0]						0	
0x0D	W	0 0 0 0 0 0 0 0 0	-	INMIX_L	IN_L_EN	ILEN IN LSEL[4:0]							0
0x0E	W	0 0 0 0 0 0 0 0 0	-	INMIX_R	IN_R_EN	R_EN IN_R_BEL[5:0]							0
0x0F	W	0 0 0 0 1 0 0 8	1.50	ADC_HPF	ADC_VOICE_EN		ADC_VOICE_F0[2:	0]	ADC_HPF_EN		ADC_HPF_	F0[1:0]	1000
0x10	W	0 0 0 0 0 0 0 0 0	-	ADC	ADC_R_EN	ADC_R_MUTE			ADC_L_EN	ADC_L_MUTE		ALC_EN	0
0x11	W	0 0 0 0 0 0 0 0 0	1.44	ADC_EQ1_2		ADC_EG	42_VOL[8:0]			ADC_EQ1	_VOL[9:0]		0
0x12	W	0 0 0 0 0 0 0 0 0	-	ADC_EQ3_4		ADC_EG	4_VOL[3:0]			ADC_EQS	3_VOL[3:0]		0
0x13	W	0 0 0 0 0 0 0 0 0	-	ADC_EQ5	ADC_EQ_EN		ADC_EQ_	GAIN[1:0]		ADC_EQ	5_VOL[3:0]		0
0x14	W	0 0 0 0 1 0 0 8	1	DAC_HPF	DAC_VOICE_EN		DAC_VOICE_F0[2:	0]	DAC_HPF_EN	DAC_MUTE	DAC_HPF_	F0[1:0]	1000
0x15	W	0 0 0 1 0 0 0 10	-	DAC_L	DAC_L_INV			DAC	C_L_GAIN[6:0]			_	10000
0x16	W	0 0 0 1 0 0 0 10	-	DAC_R	DAC_R_INV			DAC	C_R_GAIN[6:0]	2			10000
0x17	W	0 1 0 1 0 1 0 0 54		DAC_SEL	DAC_R_EN		DAC_R_SRC[2:0]	1	DAC_L_EN		DAC_L_SRC[2:0]		1010100
0x18	W	0 1 0 0 0 0 0 40	-	SOFT_MUTE	SOFT_MUTE	RAMP_EN				3	MUTE_RATE[2:0]		1000000
0x19	W	0 0 0 0 0 0 0 0 0		DAC_EQ1_2		DAC_EG	42_VOL[3:0]			DAC_EQ1	_VOL[3:0]		0
0x1A	W	0 0 0 0 0 0 0 0 0	1.00	DAC_EQ3_4		DAC_EG	4_VOL[3:0]			DAC_EQ3	3_VOL[3:0]		0
0x1B	W	0 0 0 0 0 0 0 0 0		DAC_EQ5	DAC_EQ_EN					DAC_EQ6	5_VOL[3:0]		0
0x1C	W	0 0 0 0 0 0 0 0 0	-	OUTMIX_L	OUT_L_EN	OUT_L_INV			9	>UT_L_SEL[4:0]			0
0x1D	W	0 0 0 0 0 0 0 0 0	-	OUTMIX_R	OUT_R_EN	OUT_R_INV			C	UT_R_SEL[4:0]			0
0x1E	W	0 0 1 1 0 1 0 1 35	-	OUT1_L	OUT1_L_EN	OUT1_L_8E			OUT1_L_V	OL[5:0]			110101
0x1F	W	0 0 1 1 0 1 0 1 35		OUT1_R	OUT1_R_EN	OUT1_R_SE			OUT1_R_V	OL[5:0]			110101
0x20	W	0 0 0 0 0 1 1 3	· ·	OUT2	OUT2_EN		0UT2_8	EL[8:0]			OUT2_VOL[2:0]		11
0x21	W	0 0 0 1 0 0 0 10	-	HP_L_VOL		HP_L_INV			HP_L_VO	L[5:0]			10000
0x22	W			HP_R_VOL		HP_R_INV			HP_R_VO	L[6:0]			10000
0x23	W	0 0 0 0 0 0 1 0 2	· ·	HP_CFG	HP_R_EN	HP_MODE	STEREO_TRACK	HP_HIGHZ_R	HP_L_EN	HP_SENSE_EN	HP_2CAP_MODE	HP_HIGHZ_L	10
Ux24	W		<u> </u>	ZEROX	HPZX_R_EN	HPZX_L_EN	OUTZX R EN	OUTZX_L_EN	INZX R_EN	INZX_L_EN	A1ZX_R_EN	A1ZX_L_EN	0
Ux25	W	0 1 1 1 0 1 1 0 76	<u> </u>	DAT_SRC_SEL	DAI_IN_R_MIX		DALOUT_R_SRC[2	:0_	DAI_IN_L_MIX	<i>م</i> رر		0]	1110110
0x26	W		<u> </u>	DAI_CFG1	DALMODE			DAL TOM_MONO	UAL_FR	Амс[1:0]	DAI_WOF	ເມ[1:0]	0
0x27	W		<u> </u>	DAI_CFG2	041.51			DATTOMOON	- BALOF	041 704	DAL CODE	A 754.03	0
0x28	W			DAL DIVIS	DALEN			DLL D0/ 1/2	DALOE	UAI_IUM	DALFORM	MILLIN	1000
0x29	W		<u> </u>						19:12] XX-X1			-	0
0.20	W		<u> </u>	PLL_DIV2			HOLY D	PLL_DIV_M[(1.1.4) 	01.0	V 1 F9-01		40000
0x28	W			PLL_DIV3	CLI CN	PLL_BTP	MULK_NA	NOLK PLACE CH		PLL_DI	V_L[6:0]		10000
UXZC	W Daad *		Cubmit 40	FIL	PLL_EN	MULN_ORM_EN	MULN_UEI_EN	MULA_BHAPE_EN	1	18	[8.0]		1010
	nead A	300	Submit Al	Reset Table									

Figure 13 Register Map Page 0

To select readback of an individual register click on the R/W bit of the required register and select R. To read the value press the submit button of the same row.

Register Map Page 0													
Register	R/₩	B7	B6	B5	B4	B3	B2	B1	BO	Hex	Submit	FUNCTION	7
0x00	W	0	0	0	0	0	0	0	0	0	·)	PAGE0	REG_P/
0x01	W	0	0	0	1	0	0	0	0	10	.)	CONTROL	WRITE_N
0x02	B	0	0	0	0	0	0	0	0	0	.)	STATUS	
0x03	W	0	0	0	0	0	0	0	0	0		STARTUP1	SC_CLK
0x04	W	0	0	0	0	0	0	0	0	0	- I	STARTUP2	
0x05	W	0	0	0	0	0	0	0	0	0	- I	STARTUP3	
0x06	W	0	0	0	0	0	0	0	0	0	- I	RESERVED	
0x07	י ₩		0	0	0	0	0	0	0	0	- I	MIC_L	MIC_L
0x08	R		0	0	0	0	0	0	0	0	- I	MIC_R	MIC_R
0x09	W	TO	0	0	1	0	0	0	0	10	- I	AUX1_L	AUX1_L
0x0A	W	0	0	0	1	0	0	0	0	10		AUX1_R	AUX1_F
0x0B	W	0	0	0	0	0	0	0	0	0		AUX2	
0x0C	W	0	0	0	0	0	0	0	0	0	-	IN_GAIN	
0x0D	W	0	0	0	0	0	0	0	0	0		INMIX_L	IN_L_
0x0E	W	0	0	0	0	0	0	0	0	0		INMIX_R	IN_R_

Figure 14 Selecting Individual Register Readback

A pop up window will then appear displaying the readback value of the register, Figure 15.

🐱 Register R	eadback Value (Hex)	×
Reg 0x6 = 0		
	<u>ok</u>	

Figure 15 Readback Pop-up Window

To select readback of all Page 0 register simultaneously press the read all button at the base of the R/W column. This will write the register readback values to a spreadheet file at the following location: *C:\Program Files\Dialog Semiconductor\Audio\DA7210_11 Rev x.x \Page0_Readback_Values.xls*

💽 Regis	ster Map	Pag	ge ()							→ [
OALO	**	•		•	•							A
0x21	W	0	0	1	1	0	1	0	1	35	_ · _]	HP_L
0x22	W	0	0	1	1	0	1	0	1	35		HP_R
0x23	W	1	0	1	0	1	1	1	0	AE		HP
0x24	W	1	1	0	0	0	0	0	0	CO		ZEF
0x25	W	0	1	1	1	0	1	1	0	76	_ · _]	DAL_SF
0x26	W	0	0	0	0	0	1	1	0	6		DAI_
0x27	W	0	0	0	0	0	0	0	0	0	_ · _]	DAI_
0x28	W	1	0	0	0	0	0	0	0	80		DAI_
0x29	W	0	0	0	0	0	0	0	0	0	_ · _]	PLL_
0x2A	W	0	0	0	0	0	0	0	0	0		PLL_
0x2B	W	0	1	0	1	0	0	0	0	50	_ · _]	PLL_
0x2C	W	0	0	0	0	1	0	1	1	В	_ · _]	PI
	Read All										Submit All	Beset

Figure 16 Readback All Registers

4.3.3 Register Map Page 1

The page 1 register map panel allows access to single bits or to the hex value of a single register; both can be submitted individually. Readback from Page 1 registers is limited, but individual register readback can be selected in the same way as Page 1 where available.

Disat	held		. 1	F						Be	set Table										
Dieur		гац	sge i Enable (4-wile lilode only)			FUNCTION	7	6	5	4	3	2	1	0	DEFAULT						
0x80	W	0	0	0	0	0	0	0 1	0	0	(†	PAGE1	REG_PAGE								0
0x81	R	0	0	0	1	0	0	0 .	1	11		CHIP_ID		MRC[3:0]				MMRC[8:0]			10001
0x82	B	0	0	1	0	1	1	0 1	0	2C		INTERFACE		IF BASE ADDR[2:0]		NCS FOL	RW_POL	CPHA	CPOL	OTP_FUSED	101100
0x83	W	0	1	0	0	0	0	0 1	0	40		ALC_MAX	ALC MAX ALC MERGE ALC MAX[5:0]							1030000	
0x84	W	0	0	0	0	0	0	0 1	0	0	14	ALC_MIN						ALC_MIN[5:0]			0
0x85	W	0	0	0	0	0	0	0 1	0	0	1 2	ALC_NOIS	ALC_NOIB ALC_NOI8(5:0)								0
0x86	W	0	0	0	0	0	0	0 1	0	0		ALC_AT	ALC_ATT ALC_ATT								0
0x87	W	0	0	0	0	0	0	0 1	0	0	100	ALC_REL	C_REL ALC_REL(7:0)						0		
0x88	W	0	0	0	0	0	0	0 1	0	0		ALC_DEL	DEL ALC_DEL'7:0						0		
0x8A	W	1	0	0	0	1	0	1	1	8B		A_HD_JNLOCK	D_INLOCK HDDBN[7:0]						10001011		
0x8B	W	1	0	1	1	0	1	0 1	0	B4	1.00	A_TST_UNLOCK		TEST[7:0]						10110100	
0x90	W	0	0	0	0	0	0	0 1	0	0		A_PLL1								VCORST_EN	0
0x95	W	0	0	0	0	0	0	0 1	0	0	144	A_ACO			1		ADC_T2				0
0x96	W	0	0	0	0	0	1	1	1	7	-	A_DAC0						VMD_EUFF_EN2	VVID_BLFF_EN'	VMID_BUFF_EN2	111
0xA7	W	0	1	1	1	1	1	1 1	0	7E		A_CP_MODE		VDC_EN	VDDV2_EN	VDD/8_EN	VDD/4_EN	HP_LYL_DET	DAC_LVL_DET	YOL_LYL_DET	1111110
0xB7	W	0	0	0	0	0	0	0 1	0	0		A_B3A ³			DIGREG_CNTL1	DIGREG_CNTL0			1000		0

Figure 17 Register Map Page 1

4.3.4 GP Filters Register Map

The general purpose filters register map panel allows access to the hex value of a single register; all registers are submitted after changes. All registers may also be reset using the *Reset Filters* button.

Filter Coefficients			
2E GP1A_A0L 38 GP1D_A0L 4 2F GP1A_A0H 39 GP1D_A0H 4 30 GP1B_A0L 3A GP2C_A0L 4 31 GP1B_A0H 3B GP2C_A0H 4 32 GP2A_A0L 3C GP2D_A0H 4 33 GP2A_A0H 3D GP2D_A0H 4 34 GP2B_A0L 3E GP1A_A1L 4 35 GP2B_A0H 3F GP1A_A1H 4 36 GP1C_A0L 40 GP1B_A1H 4 37 GP1C_A0H 41 GP1B_A1H 4	I2 GP2A_A1L 4C GP2D_A1L I3 GP2A_A1H 4D GP2D_A1H I4 GP2B_A1L 4E GP1A_A2L I5 GP2B_A1H 4F GP1A_A2L I5 GP2B_A1H 4F GP1A_A2L I6 GP1C_A1L 50 GP1B_A2L I7 GP1C_A1H 51 GP1B_A2L I8 GP1D_A1L 52 GP2A_A2L I9 GP1D_A1L 53 GP2A_A2L IA GP2C_A1L 54 GP2B_A2L IB GP2C_A1H 55 GP2B_A2L	56 GP1C_A2L 60 GP1B_B1L 57 GP1C_A2H 61 GP1B_B1H 58 GP1D_A2L 62 GP2A_B1L 59 GP1D_A2H 63 GP2A_B1H 59 GP1D_A2H 63 GP2A_B1H 54 GP2C_A2L 64 GP2B_B1H 55 GP2D_A2L 66 GP1C_B1H 50 GP2D_A2H 67 GP1C_B1H 55 GP1A_B1H 69 GP1D_B1H	6A GP2C_B1L 74 GP2B_B2L 6B GP2C_B1H 75 GP2B_B2H 6C GP2D_B1L 76 GP1C_B2L 6D GP2D_B1H 77 GP1C_B2H 6E GP1A_B2L 78 GP1D_B2L 6F GP1A_B2H 79 GP1D_B2H 70 GP1B_B2L 7A GP2C_B2L 71 GP1B_B2H 7B GP2C_B2L 72 GP2A_B2L 7C GP2D_B2L 73 GP2A_B2H 7D GP2D_B2H
FILTER COEFFICIENT REGISTERS			
0x2D 🗘 0 0x37 🗘 0 0	0x41 🗘 0 0x4B 🗘 0	0x55 ‡ 0 0x5F ‡ 0	0x69 🗘 0 0x73 🗘 0
0x2E \$ 0 0x38 \$ 0	0x42 ‡ 0 0x4C ‡ 0	0x56 🛊 0 0x60 🛊 0	0x6A \$ 0 0x74 \$ 0
0x2F 🗘 0 0x39 🗘 0	0x43 ‡ 0 0x4D ‡ 0	0x57 ‡ 0 0x61 ‡ 0	0x6B ‡ 0 0x75 ‡ 0
0x30 ‡ 0 0x3A ‡ 0 0	0x44 🗘 0 0x4E 🗘 0	0x58 ‡ 0 0x62 ‡ 0	0x6C‡0 0x76 ‡0
0x31 ‡ 0 0x38 ‡ 0 0	0x45 \$ 0 0x4F \$ 0	0x59 \$ 0 0x63 \$ 0	0x6D \$ 0 0x77 \$ 0
0x32 \$ 0 0x3C \$ 0 0	0x46 \$ 0 0x50 \$ 0	0x5A \$ 0 0x64 \$ 0	0x6E ‡ 0 0x78 ‡ 0
0x33 0 0x3D 0	0x47 0 0x51 0	0x5B ‡ 0 0x65 ‡ 0	0x6F ‡ 0 0x79 ‡ 0
0x34 ± 0 0x3E ± 0	0x48 2 0 0x52 2 0	0x5C 2 0 0x66 2 0	0x70 ± 0 0x7A ± 0
0x35 1 0x3F 1	0x49 2 0 0x53 2 0	0x5D ± 0 0x67 ± 0	0x71 ± 0 0x78 ± 0
Submit Filters Reset Filters	GP1AB/2AB - 0x7D = 34	GP1CD/2CD - 0x7E = 75	GP Enable - 0x7F 🗘 🚺

Figure 18 Filter Coefficients Set-up Panel

An alternative 'RT Filters' GUI is available that allows easy submission of any of the DAC or ADC filters paths present within the DA7210/11. This is contained on the installation DVD within the distribution kit.

4.3.5 Volume Control Panel

The *Volume Control* panel allows real time changes to any of the analogue input or output PGAs within the DUT. Muting is also possible where this function exists.

Gain controls are available to the following PGAs:

- AUX_L and AUX_R
- MIC_L and MIC_R
- A2 PGA
- Left and Right Input PGAs
- OUT1_L and OUT1_R
- HPL and HPR
- OUT2

It is possible to change the headphone and OUT1 gain control registers as stereo pairs by simultaneously selecting the *HPL follow HPR* and *OUT1L follow OUT1R* buttons.



Figure 19 Volume Control Panel

5 RT Filters GUI

The RT filters GUI allows easy control of all the filter options within the DA7210/11 device through USB control. This includes general purpose filters, five-band equalisers and voice filters for ADC and DAC.

The *Filter Setup* page makes it possible to design the required filter response for all of the general purpose filter bi-quad IIR paths available in the DA7210/11.

5.1 Software Installation

The set-up file for the RT Filters control software can be found on the accompanying DVD in the folder *DA7210 RT Filters Rev x.x*

Double click setup.exe file and the install will begin.



Do not change the installation directory or necessary license files will not be accessible.

1 DA7210 Realtime Filters Rev1_0	
Destination Directory Select the primary installation directory.	
All software will be installed in the following location(s). To install software into a different location(s), click the Browse button and select another directory.	
Directory for DA7210 Realtime Filters Rev1_0 C:\Program Files\DA7210 Realtime Filters Rev1_0\ Brows	:e
Directory for National Instruments products C:\Program Files\National Instruments\ Brows	ie
<pre></pre>	<u>C</u> ancel