Quick Start Guide
UG-378

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Overview of AD5110/AD5112/AD5114 Connections and Functionality

GENERAL DESCRIPTION

This quick start guide provides a general overview of AD5110/AD5112/AD5114 connections and functionality and should be reviewed in conjunction with the AD5110/AD5112/AD5114 data sheet.

FUNCTIONAL BLOCK DIAGRAM

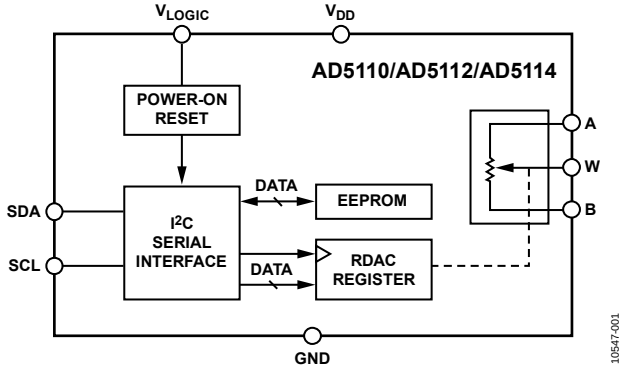
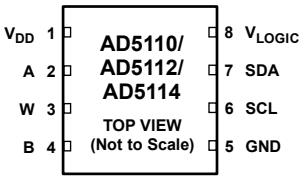


Figure 1.

PIN CONFIGURATION



NOTES
1. THE EXPOSED PAD IS INTERNALLY FLOATING.

Figure 2.

PIN FUNCTION DESCRIPTIONS

Table 1.

Pin No.	Mnemonic	Description
1	V_{DD}	Positive power supply.
2	A	Terminal A of RDAC.
3	W	Wiper terminal of RDAC.
4	B	Terminal B of RDAC.
5	GND	Ground pin.
6	SCL	Serial clock line.
7	SDA	Serial data line.
8	V_{LOGIC}	Logic power supply.
	EPAD	Internally floating exposed pad.

TYPICAL EXTERNAL CONNECTIONS

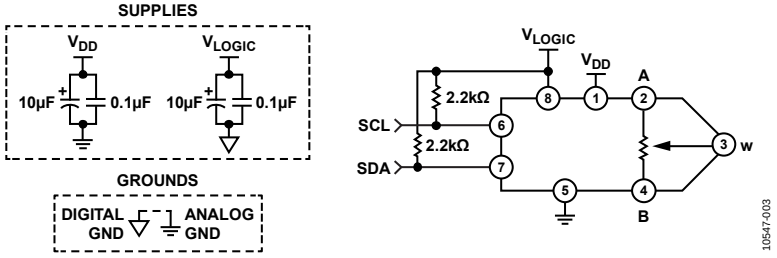


Figure 3.

OPERATIONAL CONDITIONS

Table 2. Specifications

Parameter	Specification
V_{DD} to GND	2.3 V to 5.5 V
V_{LOGIC} to GND	1.8 V to V_{DD}
V_A, V_W, V_B to GND	GND to V_{DD}
Maximum Continuous I_A, I_W, I_B	
R_{AW} = 5 kΩ and 10 kΩ	±6 mA
R_{AW} = 80 kΩ	±1.5 mA
Maximum Clock (SCL)	400 kHz

Table 3. Device Address Selection

Model	7-Bit I²C Device Address
AD511X[1] BCPZ Y[2]	0101111
AD511X[1] BCPZ Y[2]-1	0101100

[1] Model.
[2] Resistance.

SHIFT REGISTER AND TIMING DIAGRAM

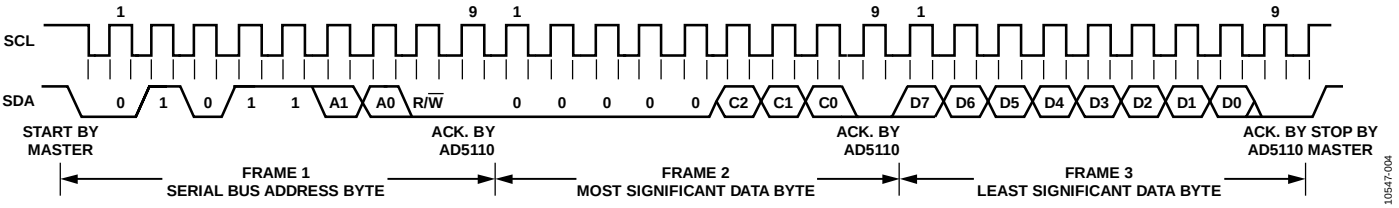


Figure 4. Write Sequence

COMMANDS

Table 4. Command Operation Truth Table

Command Number	Command DB10 C2	DB9 C1	DB8 C0	Data[1] DB7 D7	DB6 D6	DB5 D5	DB4 D4	DB3 D3	DB2 D2	DB1 D1	DB0 D0	Operation
0	0	0	0	X	X	X	X	X	X	X	X	No operation
1	0	0	1	X	X	X	X	X	X	X	X	Write contents of RDAC register to EEPROM
2	0	1	0	0	6 MSB	5	4	3	2	1[2]	0[2, 3] LSB	Write contents of serial register data to RDAC
				1	0	0	0	0	0	0	0	Top scale
				1	1	1	1	1	1	1	1	Bottom scale
3	0	1	1	X	X	X	X	X	X	X	A0	Software shutdown Shutdown off Shutdown on
4	1	0	0	X	X	X	X	X	X	X	X	Software reset: refresh RDAC register with EEPROM
5	1	0	1	X	X	X	X	X	X	X	X	Read contents of RDAC register
6	1	1	0	X	X	X	X	X	X	A1	A0	Read contents of EEPROM

A1	A0	Data
0	0	Wiper position saved
0	1	Resistor tolerance

[1] X is a don't care.
[2] In the AD5114, this bit is a don't care.
[3] In the AD5112, this bit is a don't care.

HOW TO CALCULATE THE ACTUAL END-TO-END RESISTANCE

For example, if R_{AB} = 10 kΩ and the resistor tolerance data readback shows 01010010 (see Table 5), the end-to-end resistance can be calculated as:

DB[7]: 0 = negative (1 = positive)

DB[6:3]: 1010 = 10

DB[2:0]: 010 = $2 \times 2^{-3} = 0.25$

Then:

Tolerance = −10.25% and, therefore, R_{AB} = 8.975 kΩ.

Table 5. Resistor Tolerance Format

Data Byte								
DB7	**DB6**	**DB5**	**DB4**	**DB3**		**DB2**	**DB1**	**DB0**
Sign	2^4	2^3	2^2	2	.	2^{-1}	2^{-2}	2^{-3}

EXAMPLES

Table 6. Write the RDAC Register and Place the Wiper at Zero Scale

Sequence	I²C Address	Write RDAC Command	Zero Scale
Data	0x5E	0x02	0x00

Table 7. Readback the Wiper Position Saved

Sequence	I²C Address	Write EEPROM Readback Command	Location		I²C Address	Readback Data
Data	0x5E	0x06	0x00	Repeat start	0x5F	0xXX

NOTES

REVISION HISTORY

3/12—Revision 0: Initial Version

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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