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ADN4604 4.25Gbps 16x16 Digital Crosspoint Switch Evaluation Board User Guide

INTRODUCTION

This application note describes the ADN4604 Evaluation board. It includes a quick start guide, board configuration and software installation instructions.

The ADN4604 evaluation board uses Rohs compliant FR-4 material. The both input/output differential transmission line pairs use 100Ω differential characteristic impedance. Only a limited number for the total inputs and outputs are accessible with the evaluation boards.

- Inputs: 2, 3, 6, 8, 12, 15
- Outputs: 2, 3, 8, 15

Each input and output pair is ac coupled using a capacitor. The board can easily be converted to dc coupled traces by replacing the capacitor with a 0Ω SMT resistor. The underside of the evaluation board has a differential test trace equal in length to the input or output trace.

Equipment required for evaluation:

- 3.3V power supply (two if the user wants to run the part at voltages other than 3.3V and use USB software)
- An oscilloscope
- A differential signal generator
- A PC with Microsoft Windows 2000/XP with the ADN4604 evaluation software installed.
- Some characteristic backplane or pc-board traces, perhaps of varying length,
- ADN4604 datasheet

EVALUATION BOARD OVERVIEW

Power Supply

The ADN4604 evaluation board requires a 3.3V, +/- 10% nominal power supply. Please bring this supply to the board through the test points, TP13 (+3.3V) and TP14 (VEE). See section on power configurations for other options

Data Inputs

The ADN4604 gets a differential or single-ended signal through the SMA connectors PIN and NIN. When applied a single-ended signal, please terminate one of the differential input SMA connectors with a 50Ω terminator. A differential signal level of 800 mVpp differential (+ / - 400mVd) is suggested for initial investigation. With ac signal coupling, ADN4604 supports not only CML but also LVDS, LVPECL, and LVCMOS. To match with the 50Ω transmission line, ADN4604 has on-chip, 50Ω termination resistors for its input pads. For applications that require dc-coupled inputs, replace ac-coupling capacitors with 0Ω resistors.

Data Outputs

The CML outputs are ac-coupled to the SMA connectors labeled OUTP and OUTN through ceramic capacitors. For applications that require dc-coupled outputs, replace ac-coupling capacitors with 0Ω resistors.

Figure 1. Evaluation Board

Rev. D

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Power Configurations

The reference plane (DGND) is not electrically connected to VEE to allow the board to be configured with either positive or negative or split supplies. The reference plane (DGND) is connected to the shield potential of the input and output SMA connectors. The negative supply configuration is useful when connecting the ADN4604 board to test equipment that has a 50 Ohm termination to GND, after converting the board to be DC-coupled. Diagrams of positive and negative supply configurations are illustrated in Figure 4.

Installing JP1-4 shorts VCC, VTTI_E, VTTO_N, and DVCC to +3.3V supply applied at TP13. P10 and P11 short VTTI_E to VTT_W and VTTO_N to VTTO_S respectively. Remove the jumper when you want to run a particular supply at a different level. To work properly, VMID must always be connected to a 3.3V supply for the isolation circuit that isolates the PC's VDD and VSS from the device supplies. Leave the VMID jumper installed to connect this point to DVCC.

For example the user can run the digital supply, DVCC=2.5V supply by removing P6 and connecting a 3.3V supply to TP23 (VMID). For further details see datasheet.

Table 1. Jumpers and Connectors

Jumper	Function	Default
JP1	Connects VTTI_E to TP13 (+3.3V)	Installed
JP2	Connects VTTO_N to TP13 (+3.3V)	Installed
JP3	Connects VCC to TP13 (+3.3V)	Installed
JP4	Connects DVCC to TP13 (+3.3V)	Installed
P1	I2C Connector	Installed
P5	Connects VMID to I2C level translator VCCA	Installed
P6	Connects I2C level translator VCCA to DVCC	Installed
P10	Connects VTTI_E to VTTI_W	Installed
P11	Connects VTTO_N to VTTO_S	Installed
P12	Connects DGND to VEE	Installed

Push Buttons

The evaluation board has three pushbutton switches summarized in Table 2.

Table 2. Pushbutton Switch Functions

Switches	Function
S4	ADN4604 $\overline{\text{UPDATE}}$
S5	ADN4604 $\overline{\text{RESET}}$
S6	MCU RESET

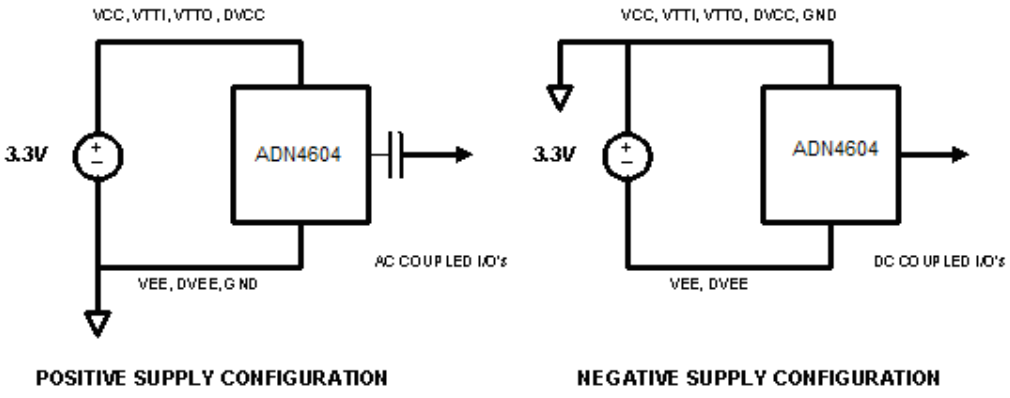

Figure 2. Power Configurations

GRAPHICAL USER INTERFACE SOFTWARE

Follow these steps to use the ADN4604 evaluation software:

1. Download and install the Microsoft .NET Framework 2.0+. This can be downloaded by following this link: http://download.microsoft.com/download/2/0/e/20e90413-712f-438c-988e-fdaa79a8ac3d/dotnetfx35.exe
2. Extract the contents of the .zip file
3. If running Windows XP, or other Windows 32-bit operating system skip to step 5.
4. Open command prompt in the extracted directory and type the following command:
   `Corflags.exe Release\ADN4604.exe /32BIT+`
   This flags the .NET Framework to operate in 32-bit mode
5. Run the executable by double-clicking on the ADN4604.exe file
6. Note: It is a known issue that if the USB communication fails, the error message does not self-clear. The application must be closed and reopened to clear the error message. The GUI will operate normally even if the error message is present.

The ADN4604 can be programmed using the graphical user interface shown in the figure above by typing in register values in the address and data fields. Register map information can be found in the ADN4604 datasheet. The programming is done with the on board Microchip micro-controller. The user will find the two LEDs, CR2 and CR3 will flash alternately signifying a good connection to the PC.

If at any time they stop flashing unplug the USB cable and plug it back in to reset the controller. Also note that the controller needs 3.3V supplied between VMID and VEE to communicate to the device. If DVCC is set to 3.3V then install P5 and P6 to connect DVCC to VMID.

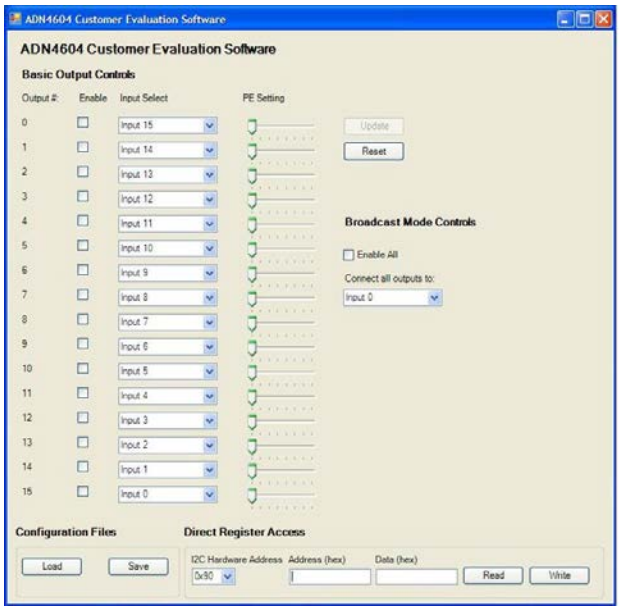

Figure 3. ADN4604 Graphical User Interface

QUICK START GUIDE:

1. The factory default settings for the all jumpers are as shown in Table 1.

2. Apply a 3.3V power to test point TP13 relative to "VEE", TP14.

3. Connect an input channel to a pattern generator to get a PRBS signal. It is important to use a pair of matched length, 50Ω cables;

4. Connect an output channel to an oscilloscope using a pair of matched length, 50Ω cables;

5. Connect the provided USB cable directly to the evaluation board and the PC (it is not recommended to use a hub since the 5V from the PC is needed on the evaluation board). Use the software provided to control the ADN4604 using I2C commands.

6. In the graphical user interface, click the enable box for the chosen output.

7. For the chosen output, select the appropriate input in the drop down menu. Click “Update”.

8. Apply a data pattern signal (any data rate up to 4.25Gb/s) to the ADN4604. A signal with amplitude 800mVpp differential is a good signal for an initial test. The ADN4604 will present its output at the OUTP and OUTN SMA connectors.