

## DE10 Lite Pin Assignment Tutorial

In order to use switches, push-buttons and 7-segment LEDs on DE10 Lite board, you need to correctly assign pins on the MAX 10 FPGA. We do this in Quartus II with the help of DE10 Lite board user manual as follows:

1. Compile your design
2. Click on Assignments > Pin Planner. This should open a new window that looks like this:

Node Name	Direction	Location	I/O Bank	VREF Group	Fitter Location	I/O Standard	Reserved	Current Strength	Slew Rate	Differential Pair	Strict Preservation
button[2]	Input	PIN_87	7	R7	NO	PIN_E12	2.5 V (default)	12mA (default)			
button[1]	Input	PIN_87	7	R7	NO	PIN_E12	2.5 V	12mA (default)			

3. At the bottom of this window you will see all of your input and output signals (from your top level entity)

4. Pins corresponding to switches, LEDs and push-buttons are tabulated in DE10 Lite board user manual. E.g. table for switches is given as:

Table 3-4 Pin Assignment of Slide Switches

Signal Name	FPGA Pin No.	Description	I/O Standard
SW0	PIN_C10	Slide Switch[0]	3.3-V LVTTTL
SW1	PIN_C11	Slide Switch[1]	3.3-V LVTTTL
SW2	PIN_D12	Slide Switch[2]	3.3-V LVTTTL
SW3	PIN_C12	Slide Switch[3]	3.3-V LVTTTL
SW4	PIN_A12	Slide Switch[4]	3.3-V LVTTTL
SW5	PIN_B12	Slide Switch[5]	3.3-V LVTTTL
SW6	PIN_A13	Slide Switch[6]	3.3-V LVTTTL
SW7	PIN_A14	Slide Switch[7]	3.3-V LVTTTL
SW8	PIN_B14	Slide Switch[8]	3.3-V LVTTTL
SW9	PIN_F15	Slide Switch[9]	3.3-V LVTTTL

So, if your design uses, e.g., switch 4 as an input, go to Pin Planner, find your signal (signal X) that corresponds to switch 4 and under Location of that signal put PIN\_A12.<sup>1</sup> The same rule applies to all other peripherals attached to MAX 10 FPGA – find corresponding pin in the user manual and copy it to the Location of desired signal.

Here is the example. Signal switch[4] corresponds to the switch 4 on the board. Thus, under Location of switch[4] we put PIN\_A12. Same applies for all other switches.

The screenshot shows the Pin Planner interface with a table of signal assignments. The table has columns for Node Name, Direction, Location, I/O Bank, EF Group, Port Location, Standby, Reserve, Port Strength, I/O Voltage, Differential, and Present. The data is as follows:

Node Name	Direction	Location	I/O Bank	EF Group	Port Location	Standby	Reserve	Port Strength	I/O Voltage	Differential	Present
switch[7]	Input	PIN_A14	7	B7_NO	PI...14	2.5 V		12...t			
switch[6]	Input	PIN_A13	7	B7_NO	PI...13	2.5 V		12...t			
switch[5]	Input	PIN_B12	7	B7_NO	PI...12	2.5 V		12...t			
switch[4]	Input	PIN_A12	7	B7_NO	PI...12	2.5 V		12...t			
switch[3]	Input	PIN_C12	7	B7_NO	PI...12	2.5 V		12...t			
switch[2]	Input	PIN_D12	7	B7_NO	PI...12	2.5 V		12...t			
switch[1]	Input	PIN_C11	7	B7_NO	PI...11	2.5 V		12...t			
switch[0]	Input	PIN_C10	7	B7_NO	PI...10	2.5 V		12...t			
<<new node>>											

<sup>1</sup> Note that switches in user manual are counted from 0, not 1.