STEP-MAX10
Hardware Manual

STEP FPGA

STEP

2017/2/14

STEP-MAX10 Hardware Manual

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1. Introduction

The STEP-MAX10 development board presents a robust, portable and easy-to-learn hardware design platform built around the Altera MAX10 FPGA. The MAX10 FPGA is well equipped to provide cost effective, single-chip solutions in control plane or data path applications and industry-leading programmable logic for ultimate design flexibility. With MAX10 FPGA, you can get lower power consumption / cost and higher performance. If you are a starter to FPGA, the STEP-MAX10 FPGA Development board is your best choice.

The STEP-MAX10 FPGA development board includes hardware such as on-board USB Blaster, 7-Segment Displays, LEDs, GPIOs and much more. By leveraging all of these capabilities, the STEP MAX10 FPGA development board is the perfect solution for learning FPGA, evaluating and prototyping the true potential of the Altera MAX10 FPGA.

2. Package Contents

Figure 1 shows a photograph of the STEP-MAX10 package.

Figure 1 The STEP MAX10 Package contents

The STEP MAX10 package includes:

1. The STEP MAX10 FPGA Development Board
2. Product Packing Box
3. Quick Start Manual

3. Layout and Components

3.1 Development Board Layout

This section presents the features and design characteristics of the board.

A photograph of the board is shown in Figure 2 and Figure 3. It depicts the layout of the board and indicates the location of the connectors and key components.

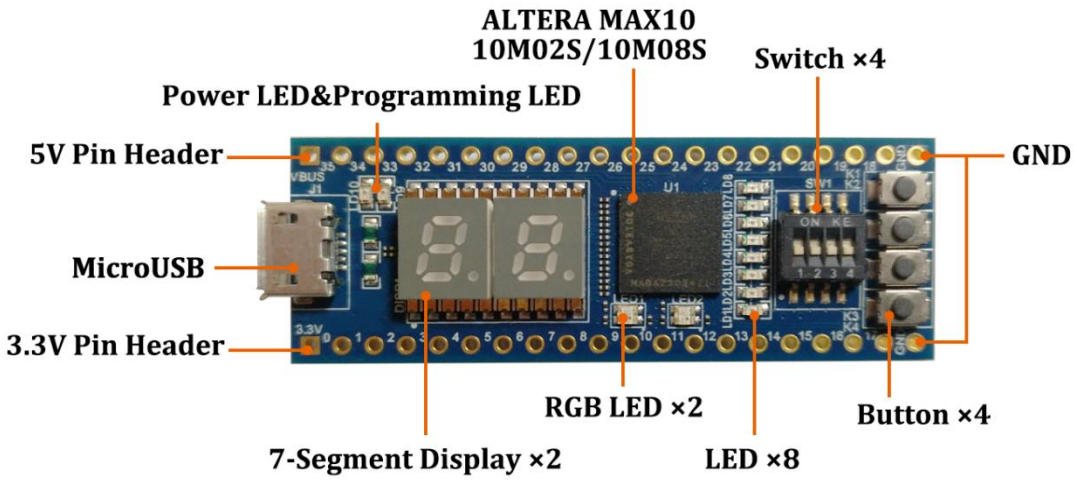

Figure 2 Development Board (top view)

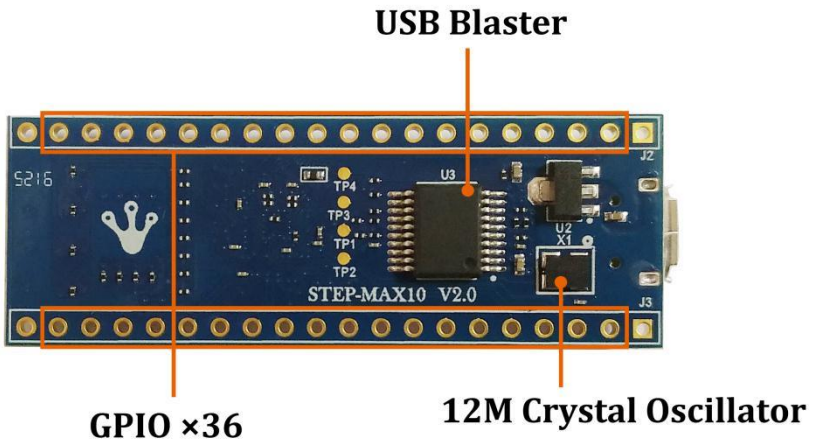

Figure 3 Development Board (bottom view)

This board has many features that allow users to implement a wide range of designed circuits, from simple circuits to various creative projects.

3.2 FPGA Device

Now the STEP-MAX10 development board have two version which the only difference of is the FPGA device.

Version	MAX10 10M02	MAX10 10M08
Series	MAX10	MAX10
Number of LABs/CLBs	125	500
Number of Logic Elements/Cells	2000	8000
Total RAM Bits	110592	387072
Number of I/O	112	112
Voltage-Supply	2.85V-3.465V	2.85V-3.465V
Package/Case	153-VFBGA	153-VFBGA
Supplier Device Package	153-MBGA(8*8)	153-MBGA(8*8)

3.3 Programming and Configuration

· On-Board USB Blaster (Normal Micro-USB connector)

3.4 Connecters

· 36 GPIO Header

3.5 Display

· 7-Segment Display ×2
· User LEDs ×8
· RGB LEDs ×2

3.6 Buttons and Switches

· Buttons ×4
· Switches ×4

3.7 Power

· 5V DC input from Micro-USB.

4. Block Diagram of Board

Figure 4 gives the block diagram of the board. To provide maximum flexibility for the user, all connections are made through the MAX 10 FPGA device. Thus, the user can configure the FPGA to implement any system design.

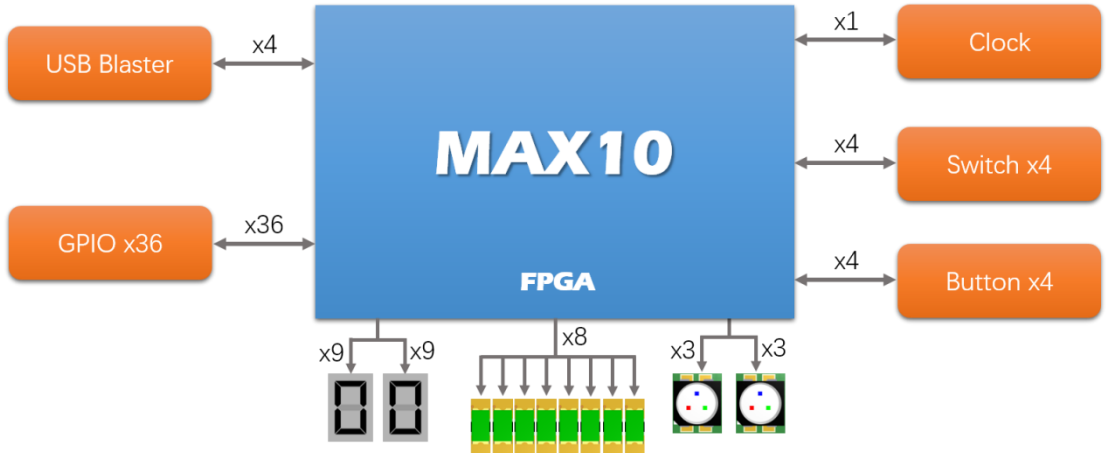

Figure 4 Board Block Diagram

There are two versions that can be selected: 10M02/10M08

5. Pins Assignments

STEP PINs	FPGA PINs	STEP PINs	FPGA PINs	Digital Display1	FPGA PINs	12M CLOCK	FPGA PINs
3.3V		VBUS		SEG-A1	E1	PCLK	J5
GPIO0	M4	GPIO35	B4	SEG-B1	D2	LED	FPGA PINs
GPIO1	P3	GPIO34	A5	SEG-C1	K2	LED1	N15
GPIO2	M5	GPIO33	A7	SEG-D1	J2	LED2	N14
GPIO3	R3	GPIO32	B6	SEG-E1	G2	LED3	M14
GPIO4	L6	GPIO31	E7	SEG-F1	F5	LED4	M12
GPIO5	P4	GPIO30	D7	SEG-G1	G5	LED5	L15
GPIO6	L7	GPIO29	B7	SEG-DP1	L1	LED6	K12
GPIO7	R5	GPIO28	C8	SEG-DIG1	E2	LED7	L11
GPIO8	P6	GPIO27	B8	Digital Display2	FPGA PINs	LED8	K11
GPIO9	R7	GPIO26	D10			Switch	FPGA PINs
GPIO10	P7	GPIO25	A9	SEG-A2	A3	SW1	J12
GPIO11	P8	GPIO24	A11	SEG-B2	A2	SW2	H11
GPIO12	P9	GPIO23	A13	SEG-C2	P2	SW3	H12
GPIO13	R9	GPIO22	B11	SEG-D2	P1	SW4	H13
GPIO14	R11	GPIO21	A14	SEG-E2	N1	Button	FPGA PINs
GPIO15	P12	GPIO20	B13	SEG-F2	C1	KEY1	J9
GPIO16	R14	GPIO19	B14	SEG-G2	C2	KEY2	K14
GPIO17	P15	GPIO18	B15	SEG-DP2	R2	KEY3	J11
GND		GND		SEG-DIG2	B1	KEY4	J14
RGB LED1	R	G	B	RGB_LED2	R	G	B
FPGA PINs	G15	E15	E14	FPGA PINs	C15	C14	D12

6. Version

Version number	Date	Comments
1.0	2017/2/14	Initial Revision