STEP-MXO2
Hardware Manual

STEP FPGA

STEP

2017/2/14

STEP-MXO2 Hardware Manual

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1. Introduction

The STEP-MXO2 development board presents a robust, portable and easy-to-learn hardware design platform built around the Lattice MachXO2 4000HC FPGA.

This board currently features the MachXO2-4000HC FPGA which offers embedded Flash technology for instanton, non-volatile operation in a single chip. Numerous system functions are included, such as two PLLs and 10 Kbits of embedded RAM plus hardened implementations of I2C, and user Flash memory.

The STEP MXO2 FPGA development board includes hardware such as on-board JTAG Programmer, 7-Segment Displays, LEDs, GPIOs and much more. By leveraging all of these capabilities, the STEP MXO2 FPGA development board is the perfect solution for learning FPGA, evaluating and prototyping the true potential of the MXO2 FPGA.

2. Package Contents

Figure 1 shows a photograph of the STEP-MXO2 package.

Figure 1 The STEP MXO2 Package contents

The STEP MXO2 package includes:
1.The STEP MXO2 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.

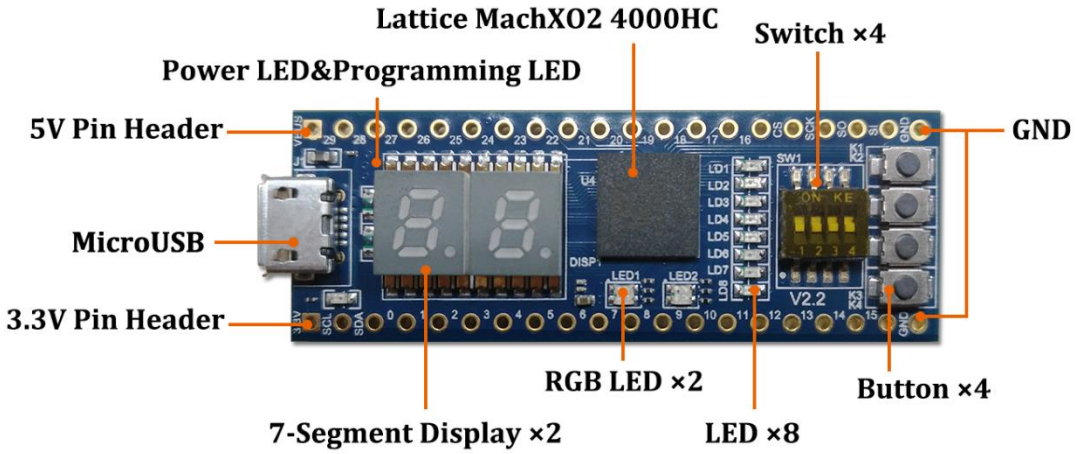

Figure 2 Development Board (top view)

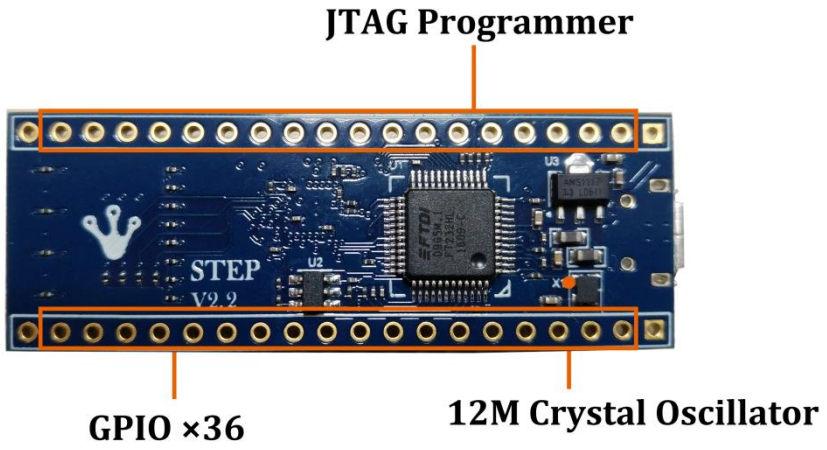

Figure 3 Development Board (bottom view)

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

Version	MachXO2 4000HC
Series	MachXO2
Density LUTs	4320
EBR SRAM(Kbits)	10
Dist. SRAM(Kbits)	34
User Flash Memory(Kbits)	96
PLL	2
DDR/DDR2/LPDDR Memory Support	YES

3.3 Programming and Configuration

· On-Board JTAG Programmer(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 MachXO2 4000HC FPGA device. Thus, the user can configure the FPGA to implement any system design.

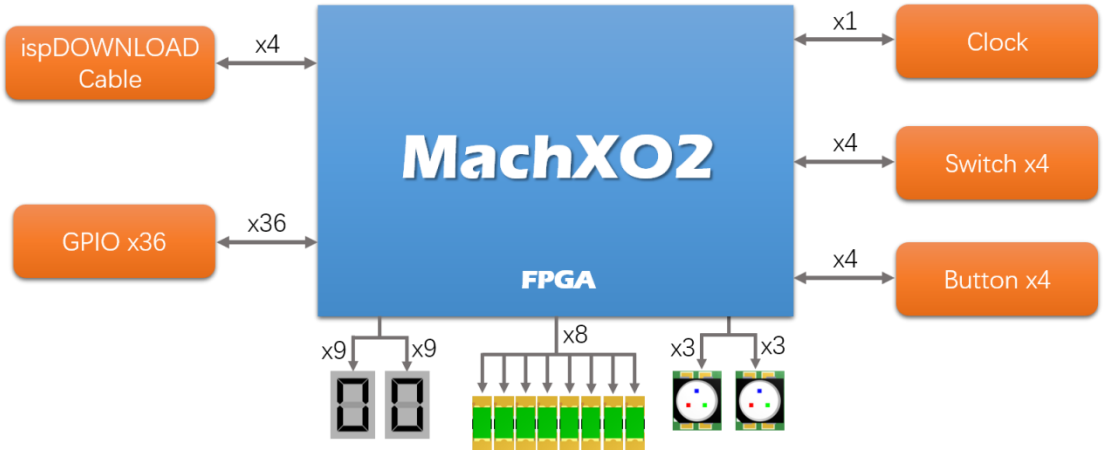

Figure 4 Board Block Diagram

5. Pins Assignments

STEP PINs	FPGA PINs	STEP PINs	FPGA PINs	Digital Display1	FPGA PINs	12M CLOCK	FPGA PINs
3.3V		VBUS		SEG-A1	A10	PCLK	C1
SCL	C8	GPIO29	E12	SEG-B1	C11	LED	FPGA PINs
SDA	B8	GPIO28	F12	SEG-C1	F2	LED1	N13
GPIO0	E3	GPIO27	G12	SEG-D1	E1	LED2	M12
GPIO1	F3	GPIO26	F13	SEG-E1	E2	LED3	P12
GPIO2	G3	GPIO25	F14	SEG-F1	A9	LED4	M11
GPIO3	H3	GPIO24	G13	SEG-G1	B9	LED5	P11
GPIO4	J2	GPIO23	G14	SEG-DP1	F1	LED6	N10
GPIO5	J3	GPIO22	H12	SEG-DIG1	C9	LED7	N9
GPIO6	K2	GPIO21	J13	Digital Display2	FPGA PINs	LED8	P9
GPIO7	K3	GPIO20	J14			Switch	FPGA PINs
GPIO8	L3	GPIO19	K12	SEG-A2	C12	SW1	M7
GPIO9	N5	GPIO18	K14	SEG-B2	B14	SW2	M8
GPIO10	P6	GPIO17	K13	SEG-C2	J1	SW3	M9
GPIO11	N6	GPIO16	J12	SEG-D2	H1	SW4	M10
GPIO12	P7	CS	P3	SEG-E2	H2	Button	FPGA PINs
GPIO13	N7	SCK	M4	SEG-F2	B12	KEY1	L14
GPIO14	P8	SO	N4	SEG-G2	A11	KEY2	M13
GPIO15	N8	SI	P13	SEG-DP2	K1	KEY3	M14
GND		GND		SEG-DIG2	A12	KEY4	N14
RGBLED1	R	G	B	RGBLED2	R	G	B
FPGA PINs	M2	N2	P2	FPGA PINs	M3	N3	P4

6. Version

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