MYiR 米尔电子
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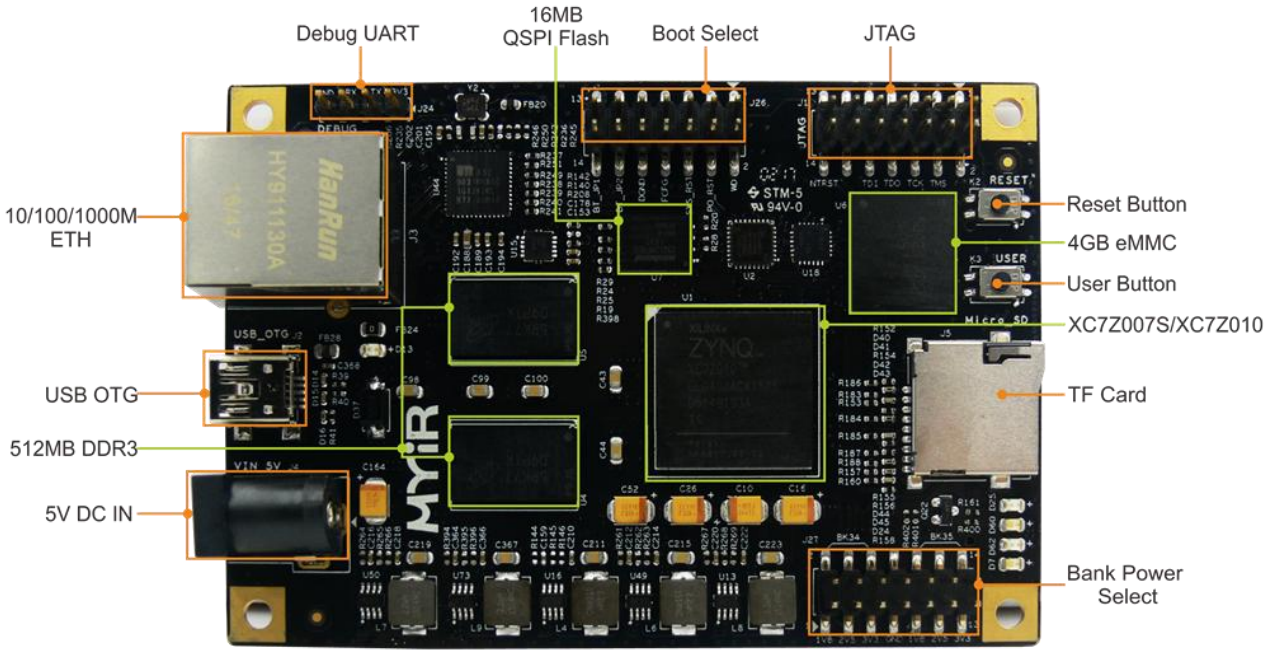
Z-turn Lite
Overview

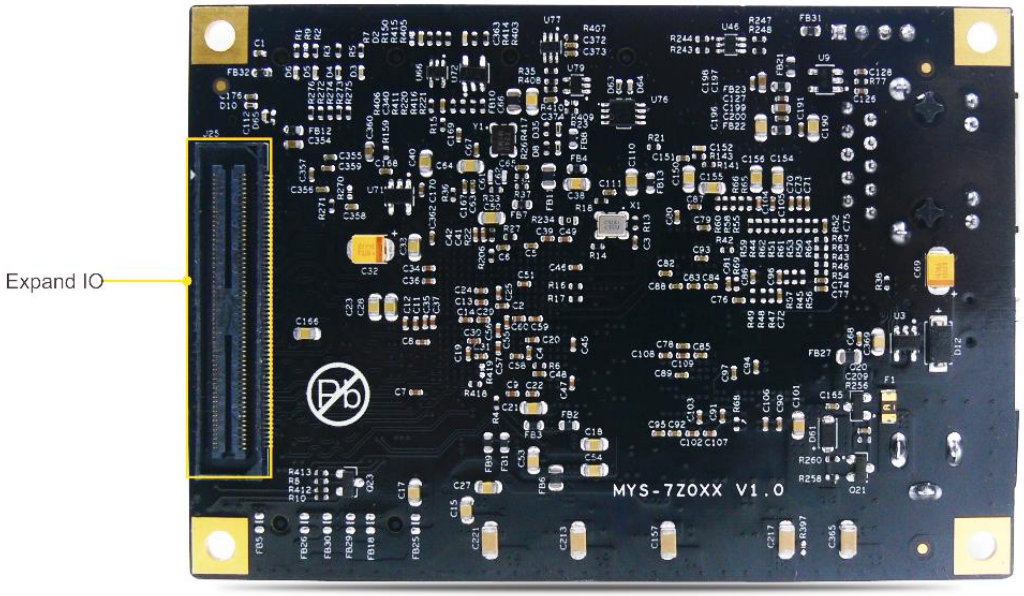
- ✓ *667MHz Xilinx XC7Z010 ARM Cortex-A9 Processor with Xilinx 7-series FPGA logic*
- ✓ *512MB DDR3 SDRAM (2 x 256MB, 32-bit), 4GB eMMC Flash, 16MB QSPI Flash*
- ✓ *USB2.0 OTG, 10/100/1000M Ethernet, TF, Debug UART, JTAG…*
- ✓ *One 120 Position Connector Socket for Expansion interface*
- ✓ *Ready-to-Run Linux Single Board Computer*
- ✓ *Optional Camera and LCD Modules, IO Extension Cape*

The **Z-turn Lite** is an ultra-cost-effective lite version of MYIR's **Z-turn board**. It is built around 766MHz Xilinx **Zynq-7010** SoC which is among the Zynq Z-7000 family with a dual-core **ARM Cortex-A9** processor and integrated Artix-7 Field Programmable Gate Array (**FPGA**) logic. It is a minimal and compact system of **Xilinx Z-7010** SoC and provides numerous pending configuration of PL resources. It is an excellent reference design and evaluation board for development based on **Xilinx Zynq-7000** series SoCs.

The **Z-turn Lite** takes full features of the **Z-7010** all programmable SoC. It is equipped with **512MB DDR3**, **4GB eMMC Flash**, **16MB QSPI Flash** and a set of peripherals including **Micro USB OTG, 10/100/1000Mbps Ethernet**, **TF**, **JTAG**, **Debug UART**, etc. Additionally, there is one **120 position connector socket** on the rear of the board to bring out as many as IO signals for user extensions.

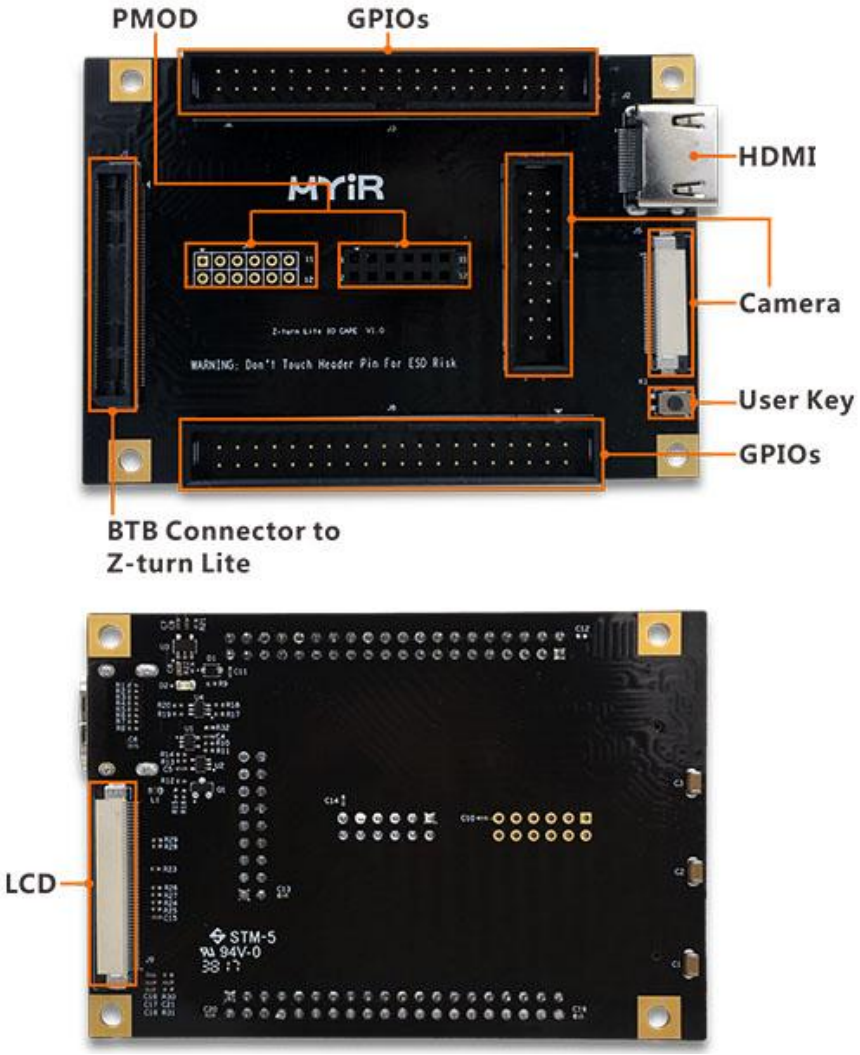


Z-turn Lite (Top-view)

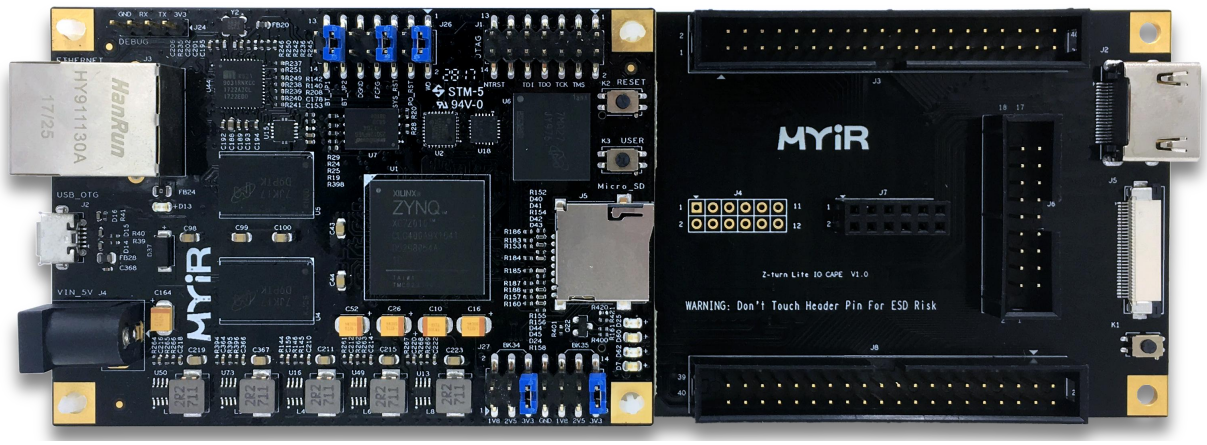


Z-turn Lite (Bottom-view)

The **Z-turn Lite** is capable of running Linux operating system and provided with **Linux 4.14.0** SDK, the kernel and many drivers are in source code. The **Z-turn Lite Kit** is delivered with complete accessories including one micro-USB cable, one Ethernet cable, one 4GB TF card, one USB-to-UART cable, one 5V power adapter and product disk which enables you to start the development quickly when getting the board out-of-the-box. MYIR also offers optional camera and LCD modules as well as an I/O expansion board **Z-turn Lite IO Cape** for Z-turn Lite which provides many peripheral signals and interfaces including HDMI, GPIO, LCD, Camera and Pmod interfaces.



Z-turn Lite IO Cape



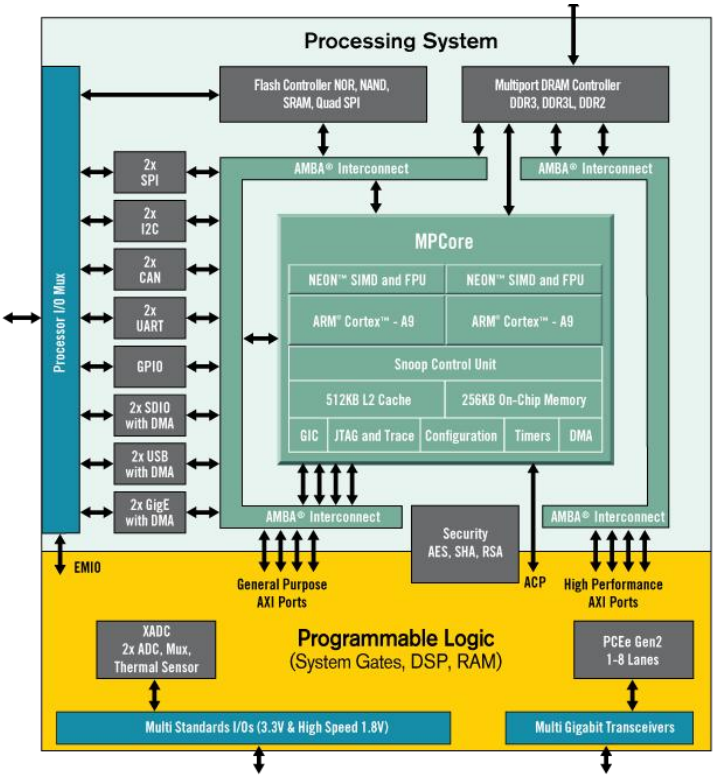
Z-turn Lite connected with Z-turn Lite IO Cape

Hardware Specification

The **Zynq®-7000 All Programmable SoC** (AP SoC) family integrates the software programmability of an ARM®-based processor with the hardware programmability of an FPGA, enabling key analytics and hardware acceleration while integrating CPU, DSP, ASSP, and mixed signal functionality on a single device. Consisting of dual-core Zynq-7000 devices, the Zynq-7000 family is the best price to performance-per-watt, fully scalable SoC platform for your unique application requirements.

Zynq-7000

Zynq-7000 devices are equipped with dual-core ARM Cortex-A9 processors integrated with 28nm Artix-7 or Kintex®-7 based programmable logic for excellent performance-per-watt and maximum design flexibility. With up to 6.6M logic cells and offered with transceivers ranging from 6.25Gb/s to 12.5Gb/s, Zynq-7000 devices enable highly differentiated designs for a wide range of embedded applications including multi-camera drivers assistance systems and 4K2K Ultra-HDTV.



Zynq Z-7000 SoC Device Block Diagram

Zynq®-7000 All Programmable SoC Family

		Cost-Optimized Devices						Mid-Range Devices			
	Device Name	Z-7007S	Z-7012S	Z-7014S	Z-7010	Z-7015	Z-7020	Z-7030	Z-7035	Z-7045	Z-7100
	Part Number	XC7Z007S	XC7Z012S	XC7Z014S	XC7Z010	XC7Z015	XC7Z020	XC7Z030	XC7Z035	XC7Z045	XC7Z100
Processing System (PS)	Processor Core	Single-Core ARM® Cortex™-A9 MPCore™ Up to 766MHz			Dual-Core ARM Cortex-A9 MPCore Up to 866MHz			Dual-Core ARM Cortex-A9 MPCore Up to 1GHz[1]			
	Processor Extensions	NEON™ SIMD Engine and Single/Double Precision Floating Point Unit per processor									
	L1 Cache	32KB Instruction, 32KB Data per processor									
	L2 Cache	512KB									
	On-Chip Memory	256KB									
	External Memory Support[2]	DDR3, DDR3L, DDR2, LPDDR2									
	External Static Memory Support[2]	2x Quad-SPI, NAND, NOR									
	DMA Channels	8 (4 dedicated to PL)									
	Peripherals	2x UART, 2x CAN 2.0B, 2x I2C, 2x SPI, 4x 32b GPIO									
	Peripherals w/ built-in DMA[2]	2x USB 2.0 (OTG), 2x Tri-mode Gigabit Ethernet, 2x SD/SDIO									
	Security[3]	RSA Authentication of First Stage Boot Loader, AES and SHA 256b Decryption and Authentication for Secure Boot									
	Processing System to Programmable Logic Interface Ports (Primary Interfaces & Interrupts Only)	2x AXI 32b Master, 2x AXI 32b Slave 4x AXI 64b/32b Memory AXI 64b ACP 16 Interrupts									
Programmable Logic (PL)	7 Series PL Equivalent	Artix®-7	Artix-7	Artix-7	Artix-7	Artix-7	Artix-7	Kintex®-7	Kintex-7	Kintex-7	Kintex-7
	Logic Cells	23K	55K	65K	28K	74K	85K	125K	275K	350K	444K
	Look-Up Tables (LUTs)	14,400	34,400	40,600	17,600	46,200	53,200	78,600	171,900	218,600	277,400
	Flip-Flops	28,800	68,800	81,200	35,200	92,400	106,400	157,200	343,800	437,200	554,800
	Total Block RAM (# 36Kb Blocks)	1.8Mb (50)	2.5Mb (72)	3.8Mb (107)	2.1Mb (60)	3.3Mb (95)	4.9Mb (140)	9.3Mb (265)	17.6Mb (500)	19.1Mb (545)	26.5Mb (755)
	DSP Slices	66	120	170	80	160	220	400	900	900	2,020
	PCI Express®	—	Gen2 x4	—	—	Gen2 x4	—	Gen2 x4	Gen2 x8	Gen2 x8	Gen2 x8
	Analog Mixed Signal (AMS) / XADC[2]	2x 12 bit, MSPS ADCs with up to 17 Differential Inputs									
	Security[3]	AES & SHA 256b Decryption & Authentication for Secure Programmable Logic Config									
	Speed Grades: Commercial	-1			-1			-1			-1
	Speed Grades: Extended	-2			-2,-3			-2,-3			-2
	Speed Grades: Industrial	-1, -2			-1, -2, -1L			-1, -2, -2L			-1, -2, -2L

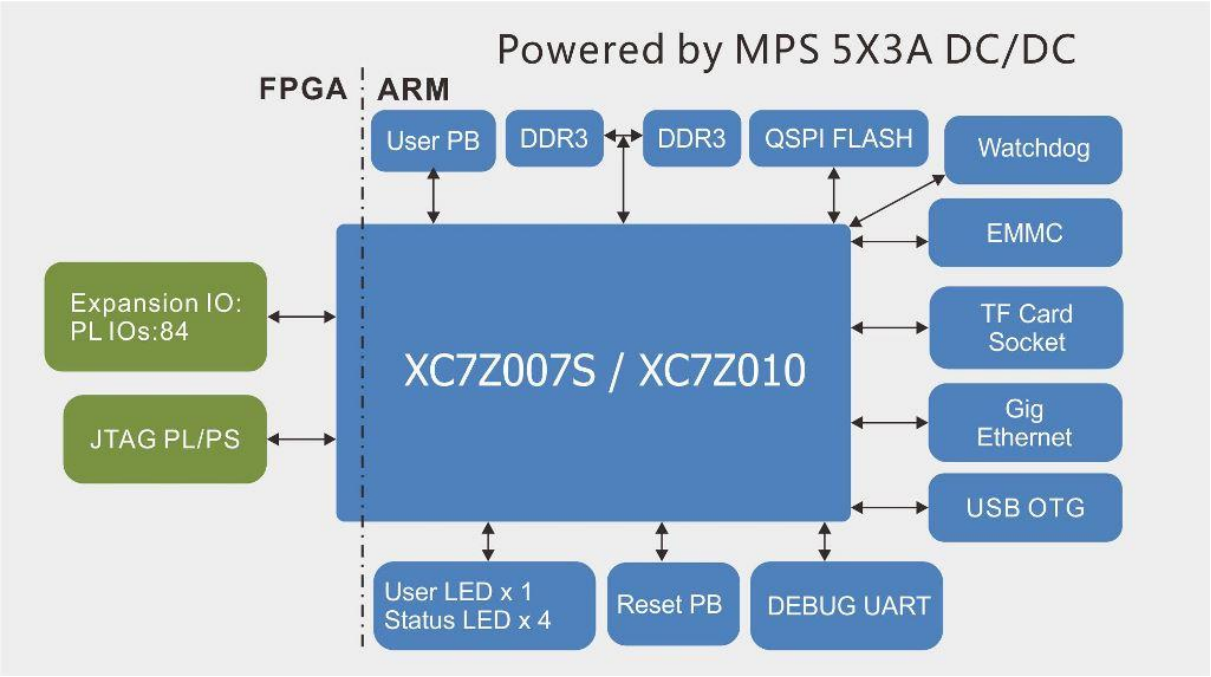
Notes:
1. 1 GHz processor frequency is available only for -3 speed grades for devices in flip-chip packages. See DS190, *Zynq-7000 All Programmable SoC Overview* for details.
2. Z-7007S and Z-7010 in CLG225 have restrictions on PS peripherals, memory interfaces, and I/Os. Please refer to UG585, *Zynq-7000 All Programmable SoC Technical Reference Manual* for more details.
3. Security block is shared by the Processing System and the Programmable Logic.

Zynq Z-7000 SoC Device Table

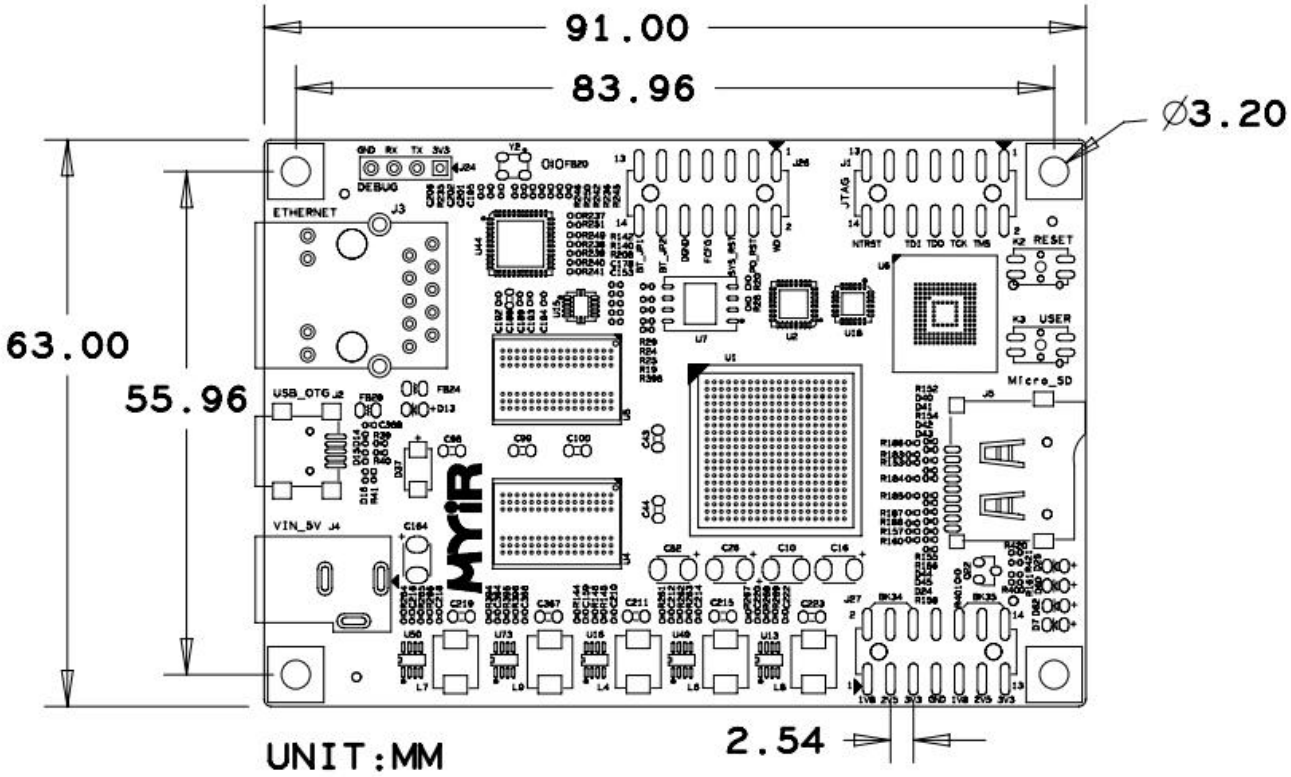
The Z-turn Lite is based on the Xilinx Zynq-7010 SoC and the hardware specification is listed in following table1-1:

Item	**Features**
SoC	Xilinx XC7Z010-1CLG400C (Zynq-7010) - 667MHz dual ARM® Cortex™-A9 MPCore processor - Integrated Artix-7 class FPGA subsystem with 28K logic cells, 17,600 LUTs, 80 DSP slices (for XC7Z010) - NEON™ & Single / Double Precision Floating Point for each processor - Supports a Variety of Static and Dynamic Memory Interfaces
Memory	512MB DDR3 SDRAM (2 x 256MB, 32-bit)
Storage	4GB eMMC Flash 16MB QSPI Flash TF card interface
Communications	1 x 10/100/1000M Ethernet 1 x Micro USB2.0 OTG
Input and Output	1 x 2.54mm pitch 14-pin JTAG interface 1 x 0.5mm pitch 120 Position Connector Socket for Expansion interface 1 x 2.54mm pitch 4-pin Debug UART interface
Others	2 x Buttons (1x Reset, 1 x User) 5 x LEDs - 1 x User LED - 1 x FPGA configuration indicator - 1 x FPGA initialization indicator - 1 x Power indicator - 1 x USB overcurrent indicator
Dimensions	91mm x 63mm (10-layer PCB design)
Power supply	DC 5V/2A
Temp.	0~70 Celsius
Power consumption	8W

Z-turn Lite Hardware Specification



Z-turn Lite Function Block Diagram



Z-turn Lite Dimension Chart

Software Features

Item	Features	Description	Remark
Cross compiler	gcc 6.2.1	gcc version 6.2.1 (Linaro GCC Snapshot 6.2-2016.11)	
Boot program	BOOT.BIN	First boot program including FSBL, bitstream and u-boot	Source code provided
Linux Kernel	Linux 4.14.0	Customized kernel for Z-turn Lite Board	Source code provided
Drivers	USB OTG	USB OTG driver	Source code provided
	Ethernet	Gigabit Ethernet driver	Source code provided
	MMC/SD/TF	MMC/SD/TF card driver	Source code provided
	Button	Button driver	Source code provided
	UART	UART driver	Source code provided
	LED	LED driver	Source code provided
	GPIO	GPIO driver	Source code provided
	HDMI	HDMI driver	Source code provided
	LCD	LCD touch screen driver	Source code provided
File System	Ramdisk	Ramdisk image system	
	Rootfs	Rootfs image system (with QT5.11.3)	Source code provided

Software Features of Z-turn Lite

Order Information

Item	Part No.	Packing List
Z-turn Lite	MYS-7Z010-L-C-S	✓ One Z-turn Lite (with XC7Z010-1CLG400C SoC) ✓ One Quick Start Guide ✓ One 16GB TF card
Z-turn Lite Kit	MYS-7Z010-L-C	✓ One Z-turn Lite (MYS-7Z010-L-C-S) ✓ One Quick Start Guide ✓ One 1.5m cross Ethernet cable ✓ One 1.2m Micro USB2.0 cable ✓ One USB-to-UART cable ✓ One 16GB TF card ✓ One 5V/2A Power adapter
MY-CAPE002		Z-turn Lite IO Cape
MY-TFT070CV2		MY-TFT070CV2 7-inch LCD Module (Support through Z-turn Lite IO Cape, with capacitive touch screen)
MY-CAM002U		USB Camera Module

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