Z-turn Board
Product User Manual

Version 1.0

April 22, 2015

Revision History

Version	Description	**Date**
V1.0	Initial release	2014/12/4
V1.2	Merge with XC7Z020	2015/4/22
V1.3	Correct Table CN2 pin description error	2015/7/27
V1.4	Correct Table CN1 pin 53,56 and Bank 500,501 description error	2015/8/17

Table of Contents

Chapter 1 Overview

1.1 Introduction

Z-turn Board is an embedded development board launched by MYIR, using Xilinx Zynq-7010/7020 as the main SoC. Using Xilinx latest 28nm technology, Z-turn Board is based on the Zynq-7000 All Programmable SoC platform, tight integrating ARM processor with the FPGA framework. This product inherits the high-performance, low power merits of dual-core ARM Cortex-A9 MPCore, which can be better meet the needs of various industrial applications.

MYIR also offers a variety of mature hardware solutions and rich software resources about Linux and Android operating system. An integrated hardware/software architecture solution allows you to focus on developing applications.

1.2 Appearance

Figure 1-1

Chapter 2 SoC

2.1 SoC Feature

The development board uses Xilinx Zynq-7000 All Programmable SoC XC7Z010/XC7Z020. Tight integrating ARM processor with the FPGA framework, the Zynq-7000 series SoC incorporates a processing system core unit (PS) with two ARM® Cortex™ - A9 core and a programmable logic unit (PL). The ARM processor has more powerful computational capacity than its counterpart in market, and the FPGA framework is entirely programmable, which, integrating with the I/O ports led from the development board, can meet the requirements of a variety of applications.

NOTE: The development board SoC model is XC7Z010 or XC7Z020, which packages CLG400 (17x17 mm), they are Pin-to-Pin and can pin compatible. The only difference between XC7Z010 and XC7Z020 lies in the PL unit. XC7Z020 has more logic units than XC7Z010, and is applicable to more complex applications.

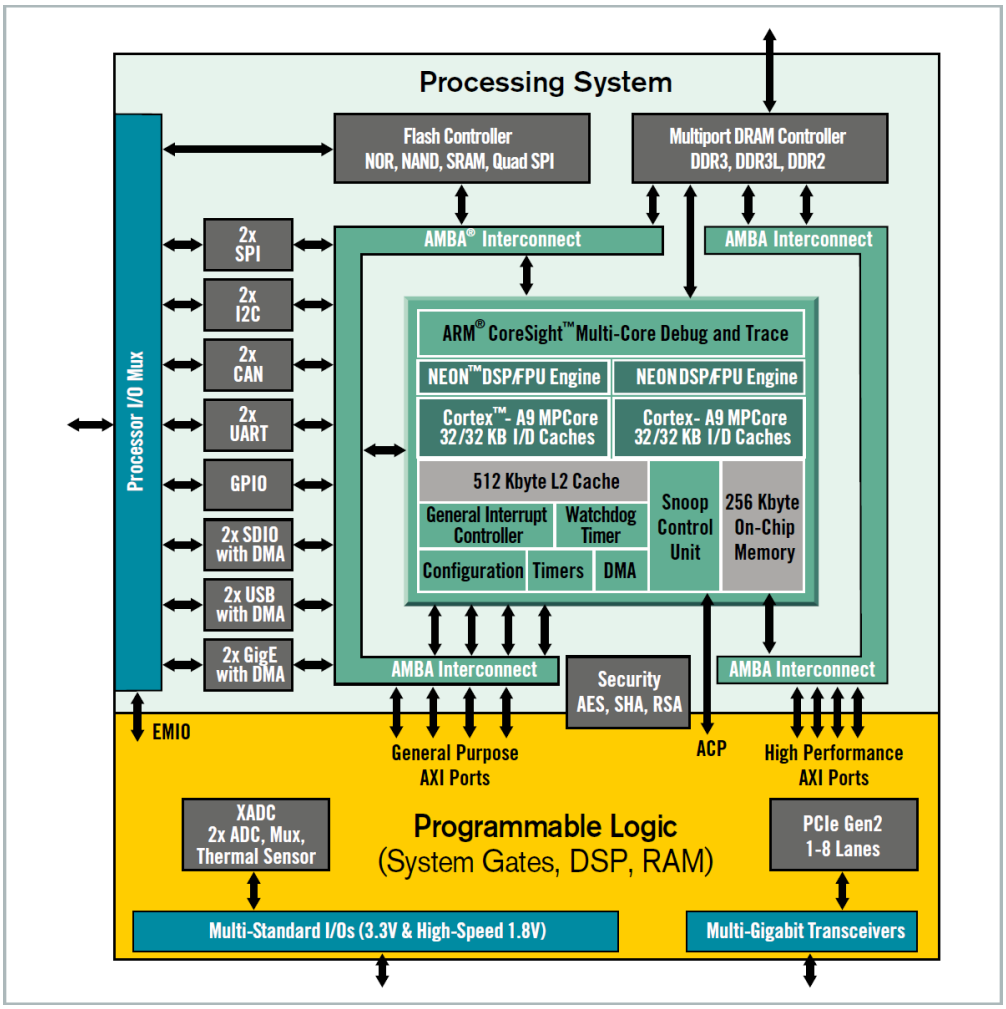


Figure 2-1 ZYNQ-7000 Series SoC architecture

- **Processing System (PS)**
  - **Processor Core:** Dual ARM® Cortex™-A9 MPCore™ with CoreSight™
  - **Maximum Frequency:** 866 MHz
  - **L1 Cache:** 32 KB Instruction, 32 KB Data per processor
  - **L2 Cache:** 512 KB
  - **On-Chip Memory:** 256 KB
  - **External Memory:** DDR3, DDR3L, DDR2, LPDDR2
  - **External Static Memory:** 2x Quad-SPI, NAND, NOR
  - **DMA Channels:** 8 (4 dedicated to Programmable Logic)
  - **Peripherals:** 2x UART, 2x CAN 2.0B, 2x I2C, 2x SPI, 4x 32b GPIO
- **Programmable Logic (PL)**

	XC7Z010	XC7Z020

Logic Equivalent	Xilinx 7 Series Artix®-7 FPGA	
Programmable Logic Cells	28K Logic Cells (~430K ASIC Gates)	65 Logic Cells (~1300 K ASIC Gates)
Look-Up Tables	17,600	53,200
Flip-Flops	35,200	106,400
Block RAM	240 KB	560 KB
DSP slice	80	220

Table 2-1

2.1 SoC BANK

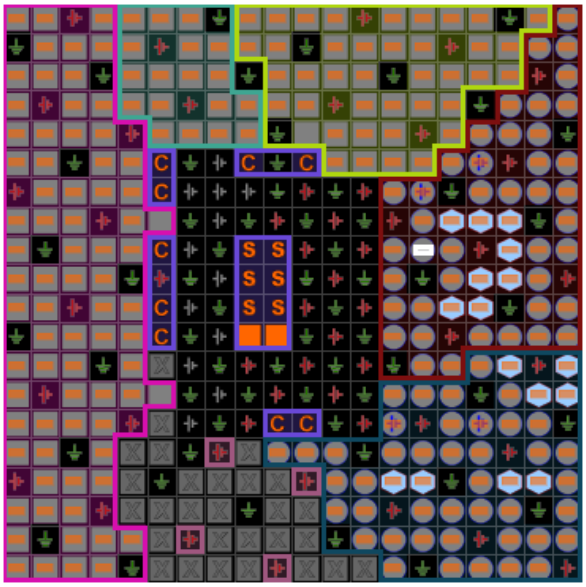


Figure 2-1 CLG400 BANKS

- **BANK 0:** JTAG, SYS RESET, Analog signal
- **BANK 13:** Only for XC7Z020
- **BANK 34:** PL side, 50pin(24 pairs of differential signal)
- **BANK 35:** PL side, 50pin(24 pairs of differential signal)
- **BANK 500:** PS side, MIO[0:15],16pin, QSPI, NAND Flash, UART
- **BANK 501:** PS side, MIO[16:53] 38pin, RGMII, USB, SDIO, UART
- **BANK 502:** PS side, DDR Pin

Chapter 3 Hardware Resources

3.1 Hardware Resources on Development Board

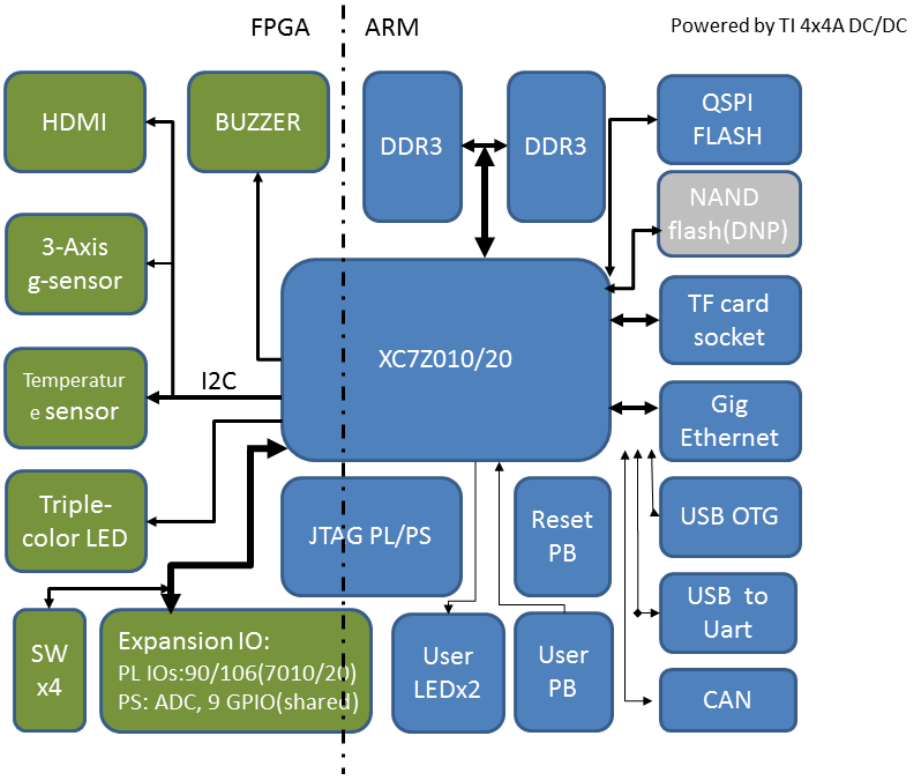


Figure 3-1

- **Hardware Resources**
  - 512MB NandFlash (NO-POP)
  - 16MB SPI Flash
  - 1GB DDR3 SDRAM (2 x 512MB), 32bit Data line
  - 10/100/1000Mb/s Ethernet
  - 3-axis accelerometer sensor
  - Temperature sensor
- **Peripheral Interface**
  - HDMI:

    1080P, HDMI output

- memory card interface:

  One Micro SD solt

- USB port:

  One Mini-USB port (OTG)

  One DEBUG UART to USB

- NET port:

  One CAN interface

  One 10/100/1000Mb/s Gigabit Ethernet

- User interface:

  4 Bit toggle switch, 2 Button (1 RESET, 1 User)

- LED:

  2 Users LED

  1 FPGA config LED

  1 Power LED

  1 RBG LED

- Sound Out:

  Buzzer

- JTAG：

  1 14PIN Double pin, 2.54mm pitch

- Expansion Interface:

  Two 80PIN (total 160PIN) double interface, 1.27mm pitch

Chapter 4 Interface

4.1 Interface on board

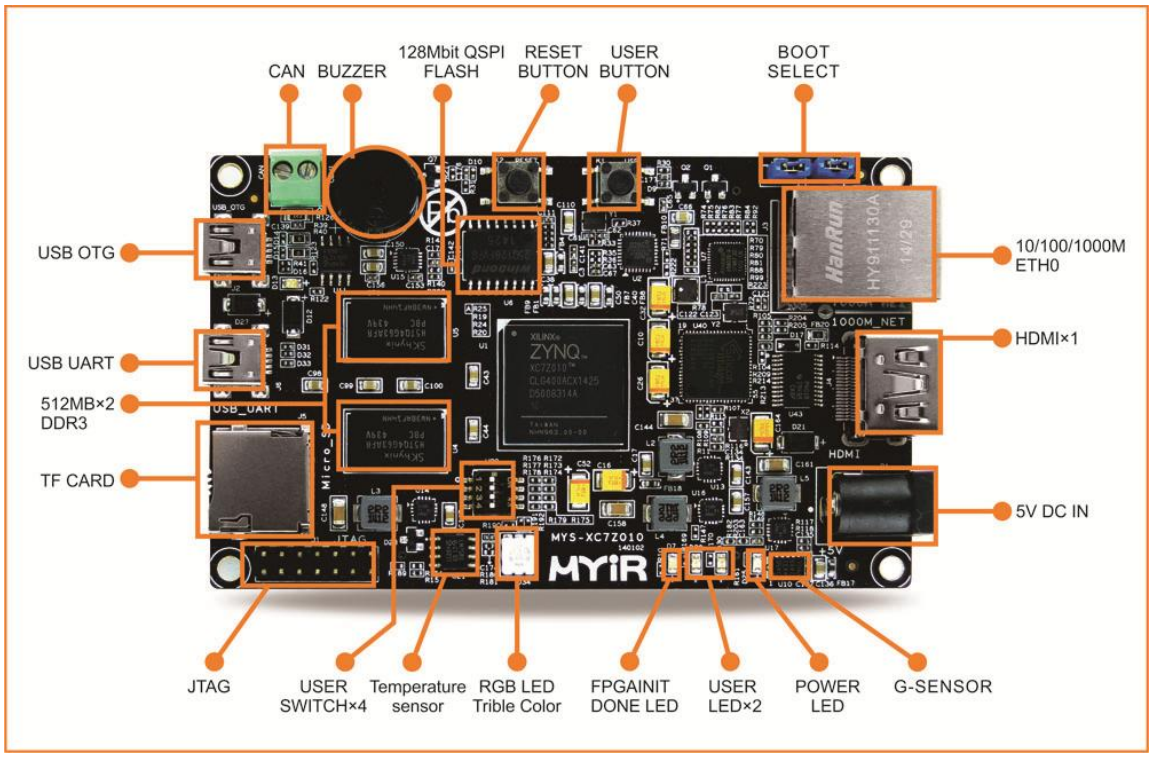


Figure 4-1

4.1.1 Connector

Ref	Description	Remark
J1	JTAG	14-Pin
J2	USB Mini	USB OTG
J3	10/100/1000 Ethernet	RJ45
J4	HDMI	Type A male
J5	Micro SD Card slot	
J6	Debug UART to USB	UART to USB
JP1	Boot mode select Jumper	Please refer to Table 5-1
JP2	Boot mode select Jumper	Please refer to Table 5-1
CON1	CAN bus	
M1	Buzzer	
U20	Switch x 4 [1]	
P1	5V DC Power jack	
D7	FPGA DONE LED	

Ref	Description	Remark
D13	USB VBUS LED	
D25	Power LED	Blue
D29	User LED 1	Red
D30	User LED 2	Red
D34	RGB LED	
CN1	Expand Interface 1	
CN2	Expand Interface 2	

Table 3-1

NOTE [1]: The RGB LEDs are controlled directly by software logic PL; If SW4 is set "HIGH", the on/off of RGB component is controlled by the SW1, SW2, and SW3, respectively; and if SW4 is set “LOW”, the RGB LEDs is accordance with PS.

4.2 Expand Interface Definition

The two extended interface on the development board are CN1 and CN2, which can be used to connect the dock board to expand its function. Just as the following table shows, the slot looking like IO_L11P_T1_13 is for PL pin, and the slot looking like PS_MIO9_500 is for PS pin. The last number shows the specific BANK.

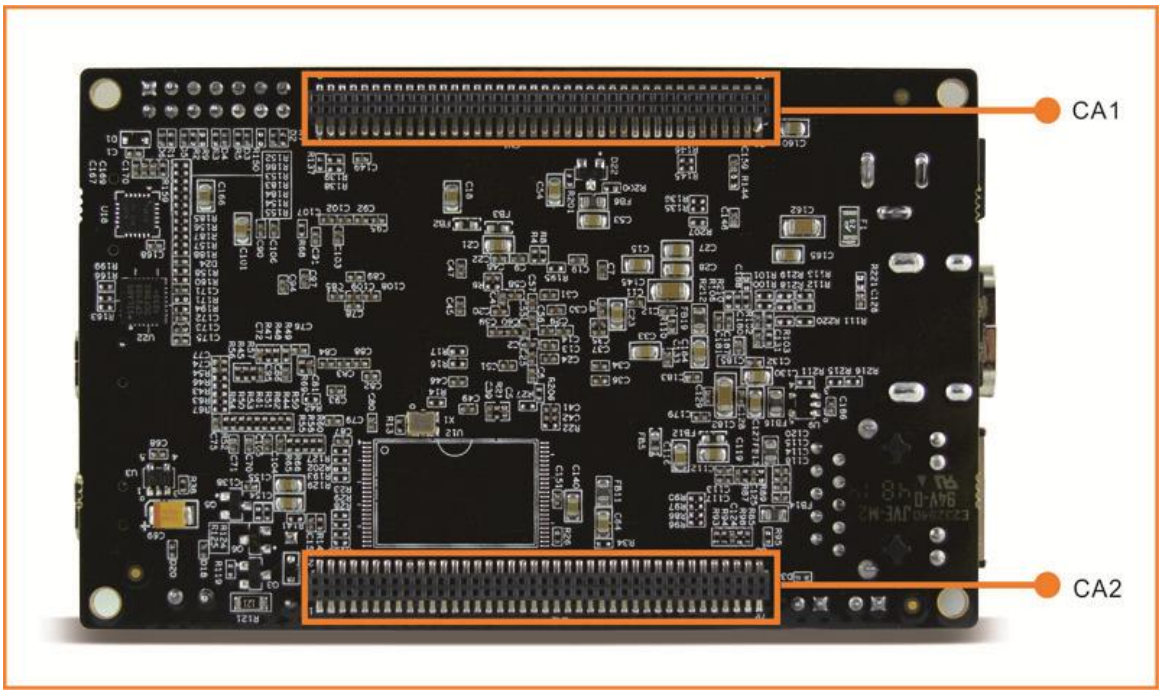


Figure 4-2

Table CN1

Default Function	BGA	Pin Name	CN1		Pin Name	BGA	Default Function
		VDD_5V	1	2	GND		
		VDD_3.3V	3	4	GND		
		VDD18_KEY_BACKUP	5	6	JTAG_TCK	F9	
	U7	IO_L11P_T1_13	7	8	JTAG_TMS	J6	
	V7	IO_L11N_T1_13	9	10	JTAG_TDI	G6	
	T9	IO_L12P_T1_13	11	12	JTAG_TDO	F6	
	U10	IO_L12N_T1_13	13	14	JTAG_NTRST		
		VDDIO_13_PL	15	16	IO_L14P_T2_13	Y9	
	Y7	IO_L13P_T2_13	17	18	IO_L14N_T2_13	Y8	
	Y6	IO_L13N_T2_13	19	20	IO_L21P_T3_13	V11	
	V8	IO_L15P_T2_13	21	22	IO_L21N_T3_13	V10	
	W8	IO_L15N_T2_13	23	24	GND		
		GND	25	26	IO_L1P_T0_34	T11	
	T12	IO_L2P_T0_34	27	28	IO_L1N_T0_34	T10	
	U12	IO_L2N_T0_34	29	30	IO_L3P_T0_34	U13	
	V12	IO_L4P_T0_34	31	32	IO_L3N_T0_34	V13	
	W13	IO_L4N_T0_34	33	34	GND		
		GND	35	36	IO_L5P_T0_34	T14	
	P14	IO_L6P_T0_34	37	38	IO_L5N_T0_34	T15	
RGB LED	R14	IO_L6N_T0_34	39	40	IO_L7P_T1_34	Y16	RGB LED
	W14	IO_L8P_T1_34	41	42	IO_L7N_T1_34	Y17	RGB LED
	Y14	IO_L8N_T1_34	43	44	GND		
12M	U14	IO_L11P_T1_34	45	46	IO_L10P_T1_34	V15	LCD_DATA2
	U15	IO_L11N_T1_34	47	48	IO_L10N_T1_34	W15	LCD_DATA3
		VDDIO_34_PL	49	50	IO_L13P_T2_34	N18	LCD_DATA6
LCD_DATA0	T16	IO_L9P_T1_34	51	52	IO_L13N_T2_34	P19	LCD_DATA7
LCD_DATA1	U17	IO_L9N_T1_34	53	54	GND		
LCD_DATA4	U18	IO_L12P_T1_34	55	56	IO_L15P_T2_34	T20	LCD_DATA10
LCD_DATA5	U19	IO_L12N_T1_34	57	58	IO_L15N_T2_34	U20	LCD_DATA11
LCD_DATA8	N20	IO_L14P_T2_34	59	60	IO_L17P_T2_34	Y18	LCD_DATA14
LCD_DATA9	P20	IO_L14N_T2_34	61	62	IO_L17N_T2_34	Y19	LCD_DATA15
LCD_DATA12	V20	IO_L16P_T2_34	63	64	IO_L19P_T3_34	R16	LCD_DE
LCD_DATA13	W20	IO_L16N_T2_34	65	66	IO_L19N_T3_34	R17	LCD_PCLK
		GND	67	68	GND		
LCD_HSYNC	W16	IO_L18N_T2_34	69	70	IO_L18P_T2_34	V16	LCD_VSYNC
I2S_SCLK	T17	IO_L20P_T3_34	71	72	IO_L20N_T3_34	R18	I2S_FSYNC_OUT
I2S_FSYNC_IN	V18	IO_L21N_T3_34	73	74	IO_L21P_T3_34	V17	I2S_Dout
I2S_Din	W18	IO_L22P_T3_34	75	76	IO_L24P_T3_34	P15	I2C0_SDA
HDMI_INT	W19	IO_L22N_T3_34	77	78	IO_L24N_T3_34	P16	I2C0_SCL
MEMS_INTn	N17	IO_L23P_T3_34	79	80	IO_L23N_T3_34	P18	BP

Table CN2

Default Function	BGA	Pin Name	CN2		Pin Name	BGA	Default Function
		VDD_5V	1	2	GND		
		VDD_3.3V	3	4	GND		
	K9	XADC_INP0	5	6	DXP_0	M9	
	L10	XADC_INN0	7	8	DXN_0	M10	
		XADC_VCC	9	10	GND		
PS_USER_LED1	E6	PS_MIO0_500	11	12	PS_MIO10_500	E9	UART0_RX
NAND_REn	D5	PS_MIO8_500	13	14	PS_MIO11_500	C6	UART0_TX
PS_USER_LED2	B5	PS_MIO9_500	15	16	PS_MIO14_500	C5	CAN0_RX
I2C1_CLK	D9	PS_MIO12_500	17	18	PS_MIO15_500	C8	CAN0_TX
I2C1_SDA	E8	PS_MIO13_500	19	20	GND		
		GND	21	22	IO_L2P_T0_35	B19	
	C20	IO_L1P_T0_35	23	24	IO_L2N_T0_35	A20	
	B20	IO_L1N_T0_35	25	26	IO_L4P_T0_35	D19	
	E17	IO_L3P_T0_35	27	28	IO_L4N_T0_35	D20	
	D18	IO_L3N_T0_35	29	30	GND		
		GND	31	32	IO_L6P_T0_35	F16	
	E18	IO_L5P_T0_35	33	34	IO_L6N_T0_35	F17	
	E19	IO_L5N_T0_35	35	36	IO_L8P_T1_35	M17	
	M19	IO_L7P_T1_35	37	38	IO_L8N_T1_35	M18	
	M20	IO_L7N_T1_35	39	40	GND		
		GND	41	42	IO_L10P_T1_35	K19	
	L19	IO_L9P_T1_35	43	44	IO_L10N_T1_35	J19	
	L20	IO_L9N_T1_35	45	46	IO_L12P_T1_35	K17	
	L16	IO_L11P_T1_35	47	48	IO_L12N_T1_35	K18	
	L17	IO_L11N_T1_35	49	50	GND		
		VDDIO_35_PL	51	52	IO_L14P_T2_35	J18	
	H16	IO_L13P_35	53	54	IO_L14N_T2_35	H18	
	H17	IO_L13N_35	55	56	IO_L16P_T2_35	G17	
	F19	IO_L15P_T2_35	57	58	IO_L16N_T2_35	G18	
	F20	IO_L15N_T2_35	59	60	GND		
		GND	61	62	IO_L18P_T2_35	G19	
	J20	IO_L17P_T2_35	63	64	IO_L18N_T2_35	G20	
	H20	IO_L17N_T2_35	65	66	IO_L20P_T3_35	K14	
	H15	IO_L19P_T3_35	67	68	IO_L20N_T3_35	J14	
	G15	IO_L19N_T3_35	69	70	GND		
		GND	71	72	IO_L22P_T3_35	L14	
	N15	IO_L21P_T3_35	73	74	IO_L22N_T3_35	L15	
	N16	IO_L21N_T3_35	75	76	IO_L24P_T3_35	K16	
	M14	IO_L23P_T3_35	77	78	IO_L24N_T3_35	J16	
	M15	IO_L23N_T3_35	79	80	GND		

Chapter 5 Hardware Introduction

5.1 Power

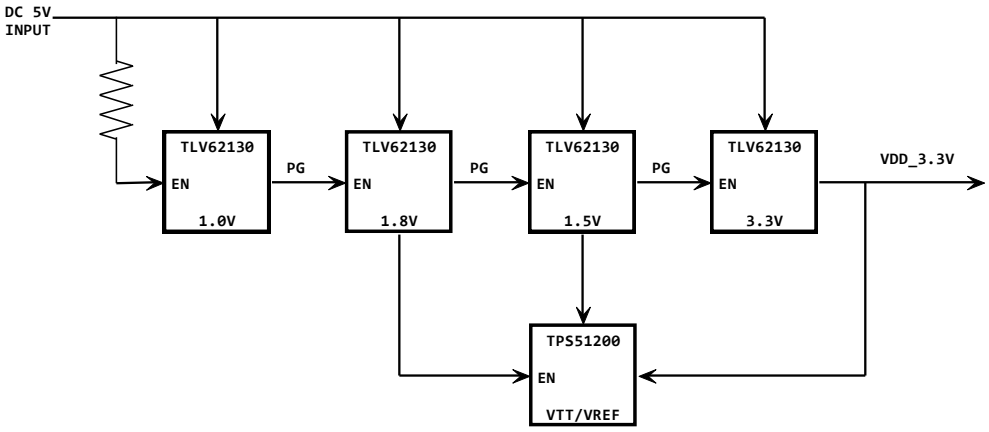


Figure 5-1

This figure shows the flow chart of the development board power supply. Cascade these modules sequentially as 1.0V-> 1.8V-> 1.5V-> 3.3V to supply power. The development board also provides a reset signal for system reset operation.The IO level of each PL/PS pin is provided by the processor.

5.2 Boot Mode

The development board provides two boot modes by default. Users can boot the system from the SD or from the QSPI, which are selected by Jumper JP1 and JP2.

JP1	JP2	Boot Mode	Comment
ON	ON	QSPI	
ON	OFF	JTAG	
OFF	ON	SD card	
OFF	OFF	Nand Flash	N/A

Table 5-1

5.3 DDR

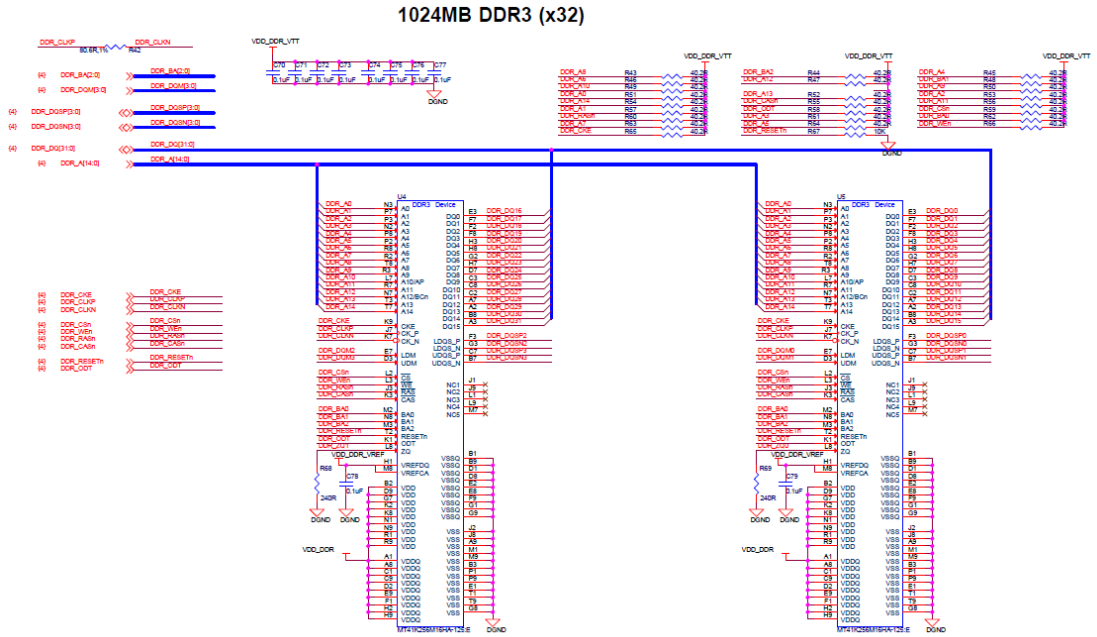


Figure 5-2

The development Board incorporates two Micron MT41K256M16HA-125: E DDR3 memory chips forming a 256M x 32-bit interface with a total of 1 GB RAM. The DDR3 memory is connected to the hard memory controller in the PS of the Zynq AP SoC. The PS incorporates both the DDR controller and the associated PHY, including its own set of dedicated I/Os. Up to 1,066 MT/s access speed for DDR3 is supported.

5.4 Storage

5.4.1 NAND Flash

The Development Board reserves a NAND Flash Pad, but is not supported currently.

5.4.2 SPI Flash

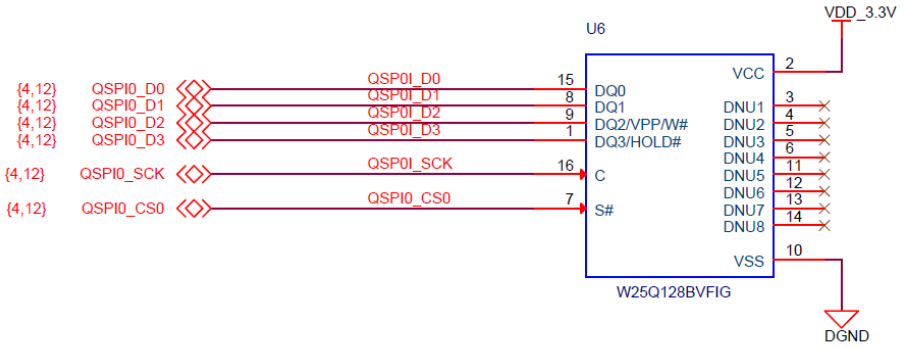


Figure 5-3

The development Board integrates a Quad-SPI Flash. W25Q128BVFIG is used on this board. It can be used to initialize the PS subsystem as well as configuring the PL subsystem (bitstream).

5.4.3 SD Card

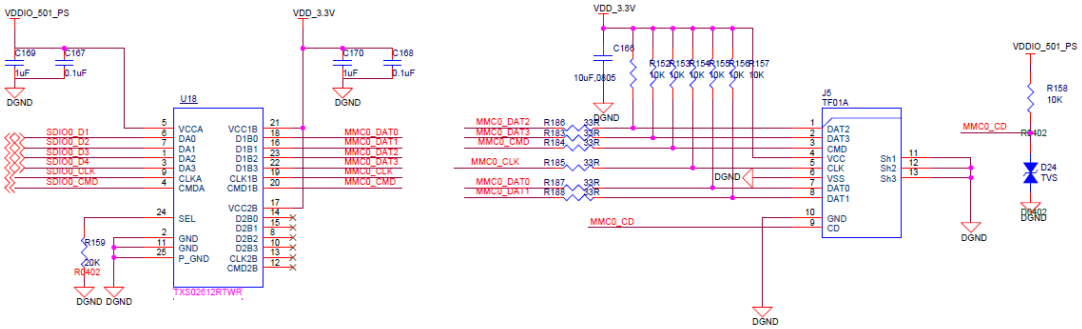


Figure 5-4

The Zynq PS SD/SDIO peripheral controls communication with the microSD Card. The microSD card can be used for non-volatile external memory storage as well as booting the SoC. PS peripheral sd0 is connected through Bank 1/501 MIO[40-46], including Card Detect. The microSD Card is a 3.3V interface, but is connected through MIO Bank 1/501 which is set to 1.8V. TXS02612 is employed to solve this problem, which is only used for voltage translation.

5.5 USB

The development board incorporates two Mini USB interfaces: J2 and J6. J2 is used as a USB OTG, and J6 is used as a debug UART to bridge to USB.

5.5.1 USB OTG

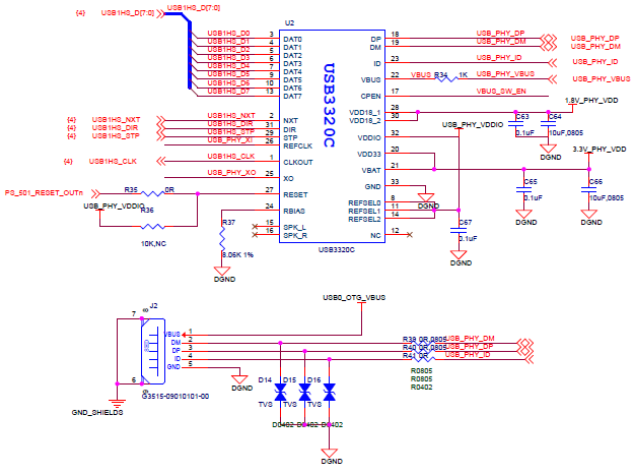


Figure 5-5

The USB OTG port J2 can be used either as a USB Host or as a USB device; when it is used as a USB Host, it can connect the U disk, USB mouse, and other USB devices; when it is used as a USB device, it can connect to other hosts, and the development board plays the role of a USB network card or a U disk in this case. Soc forms a USB 2.0 port by connecting MIO of PS section with a SMSC's USB physical layer chip USB3320C.

5.5.2 DEBUG UART to USB

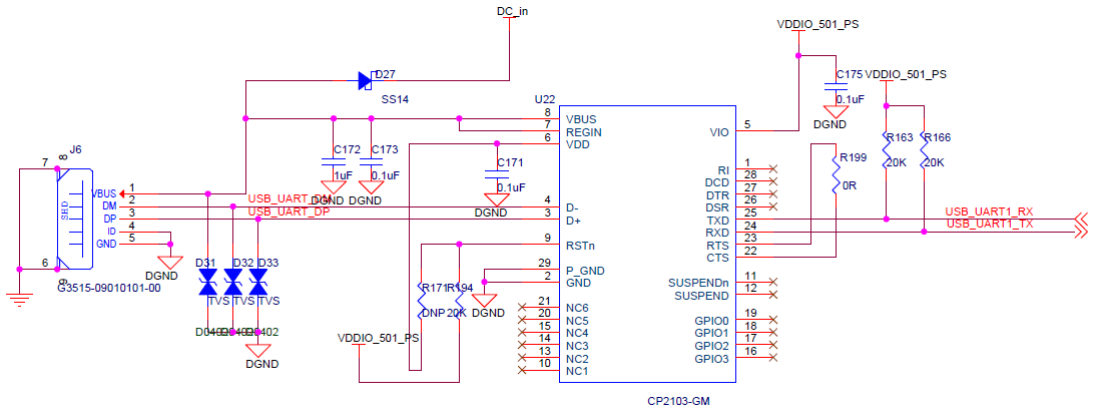


Figure 5-6

The Debug UART on the development board is TTL level, achieving convenient connection to a PC by turning a USB-UART bridge chip CP2103 into a USB port. UART interface of Zynq-7000 SoC PS section is MIO [48:49].

5.6 Enternet

The development board implements a 10/100/1000 Ethernet port for network connection using an AR8035 PHY. The PHY connects to MIO Bank 1/501 and interfaces to the Zynq-7000 AP SoC via RGMII

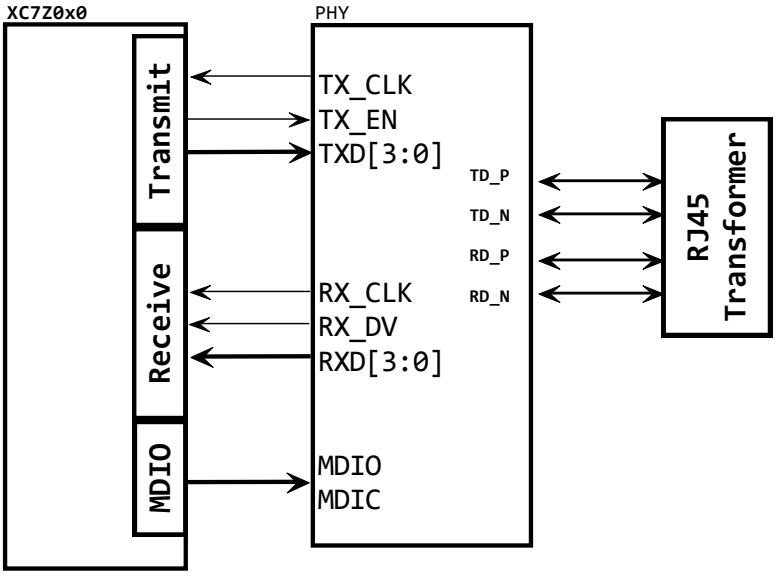


Figure 5-7

5.7 Programmable Logic Peripherals

Programmable Logic Peripherals refer to those peripherals which are realized by programmable logic and are used for connecting HDMI, sensors and other devices.

5.7.1 GPIO

EMIO for PL corresponds to the index number of GPIO, and can be used by Linux drivers directly.

(1) Four Toggle Switches

SW1: GPIO_110

SW 2: GPIO_111

SW 3: GPIO_12

SW 4: GPIO_113

(2) One RGB LED

LED_RED：GPIO_14

LED_GREEN：GPIO_115

LED_BLUE：GPIO_116

(3) One Buzzer

Beep：GPIO_117

5.7.2 I2C

HDMI Controller Sil902x: @0x3b

Tempreture Sensor LM75: @0x49

3-Axis Accelerometer Sensor ADXl345: @0x53

5.7.3 HDMI

The development board integrates a HDMI A digital video interface, using Silicon Image™ is chip SiI9022A to provide high-definition digital audio/video. In order to achieve the PS

unit of SoC controlling the HDMI, it is required to build a HDMI controller by driving the SiI9022A PL unit. The HDMI controller is built by adding IP to the PL unit, and the source code for the IP core is not provided currently.

Chapter 6 Software Resources

6.1 Linux Software Resources

Type	Name	Remark	Source
Tool chains	gcc 4.6.1	gcc version 4.6.1 (Sourcery CodeBench Lite 2011.09-50)	
Boot loader	BOOT.BIN	Include FSBL and u-boot	Yes
Linux Kernel	Linux 3.15.0	Custom for Z-turn Board	Yes
Driver	USB OTG	USB OTG driver	Yes
	Ethernet	10/100/1000Mb/s Gigabit Ethernet driver	Yes
	MMC/SD/TF	MMC/SD/TF Dirver	Yes
	CAN	CAN driver	Yes
	LCD Controller	XYLON LCD touchscreen driver	Yes
	HDMI	HDMI driver	Yes
	Button	Button driver	Yes
	UART	UART driver	Yes
	LED	LED driver	Yes
	GPIO	GPIO driver	Yes
	Buzzer	Buzzer driver	Yes
	G-Sensor	3-axis accelerometer sensor driver	Yes
	Tempreture Sensor	Tempreture Sensor driver	Yes
File system	Ramdisk	Ramdisk image	
	Ubuntu Desktop 12.04	Archive and SD Card image	

Table 6-1

6.2 Logic Resources

Type	Name	Remark	Source
Logic Peripherals	EMIO	Use for driving a DIP switch, three-color LED, buzzer	Yes
	I2C Controller	Use for dirver Tempreture Sensor, 3-axis, and connected to HDMI config	Yes
	LogiCVC	A image display controller developed by xylon (Evaluation License)	
	LogiCLK	A Clock Generator developed by xylon (Evaluation License)	
	Xillybus	Is a FIFO, what is use by AXI connected to PS from PL	

Table 6-2

Chapter 7 Getting start

7.1 Program Firmware

The development board has been programmed in QSPI-Flash (Ramdisk) before delivery. If the Ubuntu Desktop system is needed, you are required to build the system with another SD. Please refer to <Z-turn Board Linux Development Manual> for guidance.

7.2 Startup

(1) Boot mode configuration:

Make sure that the JP1 is OFF and JP2 is ON, boot from SD card.

(2) Connect to a Display device:

Connect the J4 and a monitor by HDMI cable.

(3) Setup Debug serial:

Install USB to Serial Driver from DVDROM or Slilab web site:

http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

Connect the J6 of Board to PC host by the USB cable, and open the serial terminal software on the PC with the settings as baud rate: 115200, data bits: 8, 1 stop bit, and no parity.

(4) Build a TF Boot Card of Ubuntu

Prepare a TF card with storage greater than 2GB, build a TF boot card of Ubuntu as described in Section 4.2 of <Z-turn Board Linux Development Manual>, and then insert the TF card to the development board.

(5) Power ON:

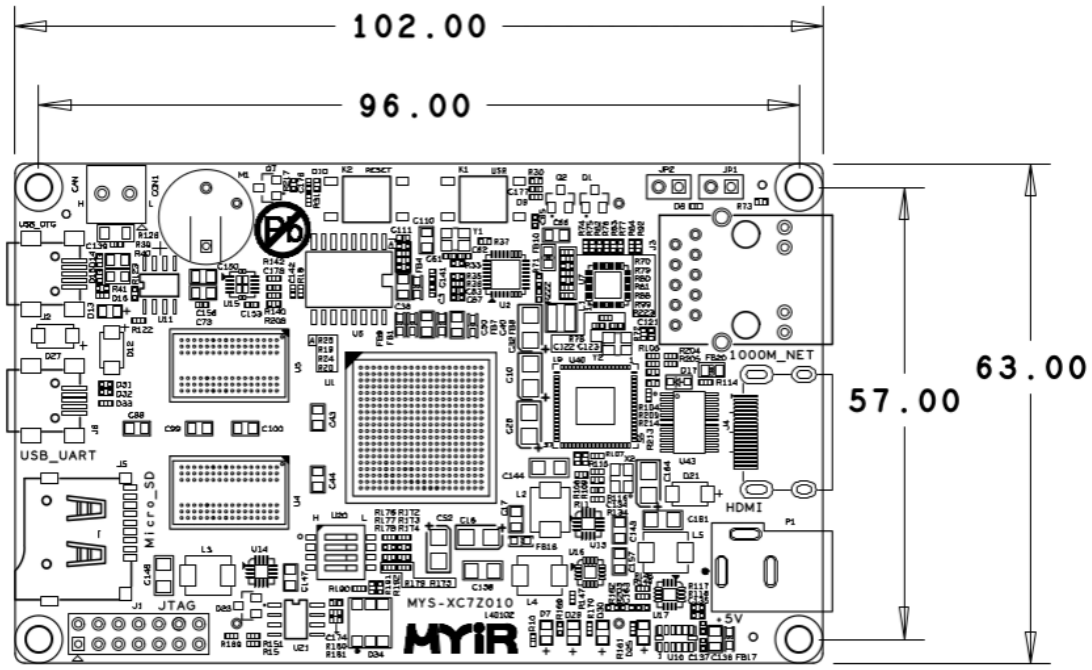
When the development board is successfully connected with the Host by a USB cable, it has been powered by the cable. Users can also power the development board by connect a 5V DC power supply with P1 port.

After power-up, the development board will enter Linux Ubuntu 12.04 Desktop system as

shown in Figure 7-1.

Figue 7-1

Chapter 8 Mechanical parameters



UNIT:MM

Figure 8-1

- Operating Temperature:
  - -40~+85 Celsius, Industrial grade(compliancewith CE, FCC, CCC)
  - -0~+ 70 Celsius, Business grade (compliancewith CE, FCC, CCC)
- Ambient Temperature: -50~100 Celsius
- Humidity: 20%~90%
- Dimensions: 63.0 mm x 102.0 mm x 1.6.0mm (W x L x H)
- PCB: 8 Layer, Flash-Gold, Lead free
- Power Input Specification: DC 5V/1A
- System Power Consumption: About 8W
- Interface: Double pin interface

Appendix 1 Warranty & Technical Support Services

MYIR Tech Limited is a global provider of ARM hardware and software tools, design solutions for embedded applications. We support our customers in a wide range of services to accelerate your time to market.

MYIR is an ARM Connected Community Member and work closely with ARM and many semiconductor vendors. We sell products ranging from board level products such as development boards, single board computers and CPU modules to help with your evaluation, prototype, and system integration or creating your own applications. Our products are used widely in industrial control, medical devices, consumer electronic, telecommunication systems, Human Machine Interface (HMI) and more other embedded applications. MYIR has an experienced team and provides custom design services based on ARM processors to help customers make your idea a reality.

The contents below introduce to customers the warranty and technical support services provided by MYIR as well as the matters needing attention in using MYIR's products.

Service Guarantee

MYIR regards the product quality as the life of an enterprise. We strictly check and control the core board design, the procurement of components, production control, product testing, packaging, shipping and other aspects and strive to provide products with best quality to customers. We believe that only quality products and excellent services can ensure the long-term cooperation and mutual benefit.

Price

MYIR insists on providing customers with the most valuable products. We do not pursue excess profits which we think only for short-time cooperation. Instead, we hope to establish long-term cooperation and win-win business with customers. So we will offer reasonable prices in the hope of making the business greater with the customers together hand in hand.

Delivery Time

MYIR will always keep a certain stock for its regular products. If your order quantity is less than the amount of inventory, the delivery time would be within three days; if your order quantity is greater than the number of inventory, the delivery time would be always four to

six weeks. If for any urgent delivery, we can negotiate with customer and try to supply the goods in advance.

Technical Support

MYIR has a professional technical support team. Customer can contact us by email (**support@myirtech.com**), we will try to reply you within 48 hours. For mass production and customized products, we will specify person to follow the case and ensure the smooth production.

After-sale Service

MYIR offers one year free technical support and after-sales maintenance service from the purchase date. The service covers:

1. Technical support service

a) MYIR offers technical support for the hardware and software materials which have provided to customers;

b) To help customers compile and run the source code we offer;

c) To help customers solve problems occurred during operations if users follow the user manual documents;

d) To judge whether the failure exists;

e) To provide free software upgrading service.

However, the following situations are not included in the scope of our free technical support service:

a) Hardware or software problems occurred during customers' own development;

b) Problems occurred when customers compile or run the OS which is tailored by themselves;

c) Problems occurred during customers' own applications development;

d) Problems occurred during the modification of MYIR's software source code.

2. After-sales maintenance service

The products except LCD, which are not used properly, will take the twelve months free maintenance service since the purchase date. But following situations are not included in the scope of our free maintenance service:

a) The warranty period is expired;

b) The customer cannot provide proof-of-purchase or the product has no serial number;

c) The customer has not followed the instruction of the manual which has caused the damage the product;

d) Due to the natural disasters (unexpected matters), or natural attrition of the components, or unexpected matters leads the defects of appearance/function;

e) Due to the power supply, bump, leaking of the roof, pets, moist, impurities into the boards, all those reasons which have caused the damage of the products or defects of appearance;

f) Due to unauthorized weld or dismantle parts or repair the products which has caused the damage of the products or defects of appearance;

g) Due to unauthorized installation of the software, system or incorrect configuration or computer virus which has caused the damage of products.

Warm tips:

1) MYIR does not supply maintenance service to LCD. We suggest the customer first check the LCD when receiving the goods. In case the LCD cannot run or no display, customer should contact MYIR within 7 business days from the moment get the goods.
2) Please do not use finger nails or hard sharp object to touch the surface of the LCD.
3) MYIR suggests user purchasing a piece of special wiper to wipe the LCD after long time use, please avoid clean the surface with fingers or hands to leave fingerprint.
4) Do not clean the surface of the screen with chemicals.
5) Please read through the product user manual before you using MYIR's products.
6) For any maintenance service, customers should communicate with MYIR to confirm the issue first. MYIR's support team will judge the failure to see if the goods need to be returned for repair service, we will issue you RMA number for return maintenance service after confirmation.

3. Maintenance period and charges

a) MYIR will test the products within three days after receipt of the returned goods and inform customer the testing result. Then we will arrange shipment within one week for the repaired goods to the customer. For any special failure, we will negotiate with customers to confirm the maintenance period.

b) For products within warranty period and caused by quality problem, MYIR offers free maintenance service; for products within warranty period but out of free maintenance

service scope, MYIR provides maintenance service but shall charge some basic material cost; for products out of warranty period, MYIR provides maintenance service but shall charge some basic material cost and handling fee.

4. Shipping cost

During the warranty period, the shipping cost which delivered to MYIR should be responsible by user; MYIR will pay for the return shipping cost to users when the product is repaired. If the warranty period is expired, all the shipping cost will be responsible by users.

5. Products Life Cycle

MYIR will always select mainstream chips for our design, thus to ensure at least ten years continuous supply; if meeting some main chip stopping production, we will inform customers in time and assist customers with products updating and upgrading.

Value-added Services

1. MYIR provides services of driver development base on MYIR's products, like serial port, USB, Ethernet, LCD, etc.
2. MYIR provides the services of OS porting, BSP drivers' development, API software development, etc.
3. MYIR provides other products supporting services like power adapter, LCD panel, etc.
4. ODM/OEM services.

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