Bioptical fusion processing platform based on Camera Link HD-SDI

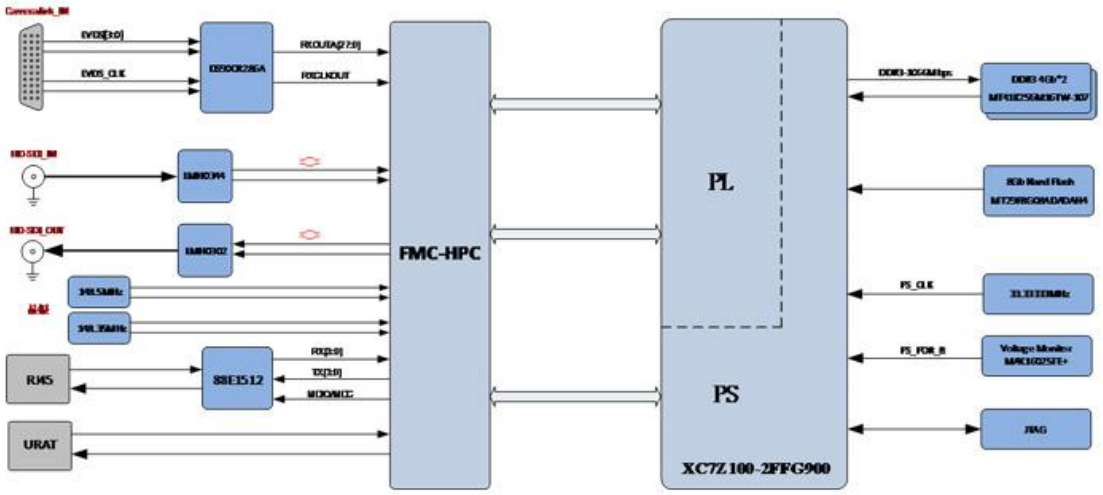


1. Overview

This platform is based on camera Raw ink and HD-SDI interface to access infrared and visible light dual-channel video, realizing image tracking, recognition and other product development. We provide a complete set of hardware and software basic development environment, including the hardware of dual-light vision platform (including camera, MPSOC core board, interface board). Overall data link software (including PL side firmware program, ARM side naked running program, PC network program). This set of software helps customers understand the synchronous transmission of video, the interrupt of AXI bus, VDMA video transmission, network LWIP protocol stack, video transmission and video display, etc., and deeply understand the transmission process of underlying data flow, interruption in continuous flow, memory management mechanism, and network TCP/UDP IP mechanism. We will help customers on product development applications, the realization of unmanned aerial vehicles, engineering vehicles, robots and other load video tracking applications.

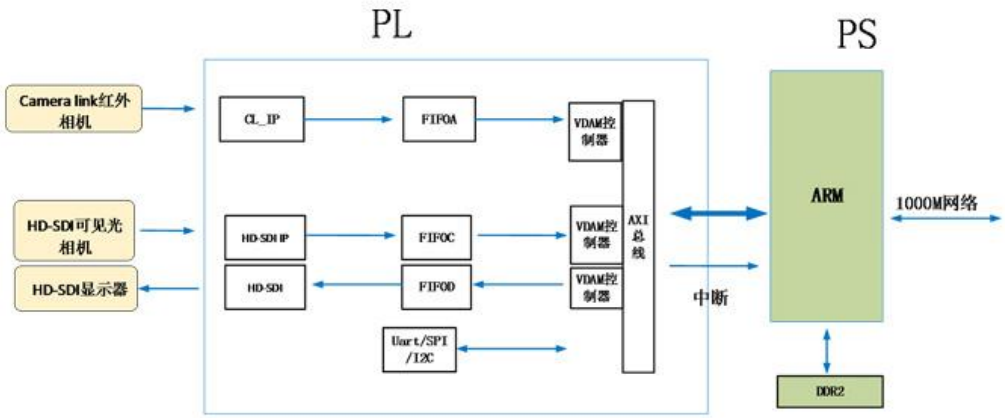
2. Hardware Function

Hardware schematic diagram



Function	Interface	Content
PL end	FMC	FMC-HPC
	Base camera link	One channnel
	HD-SDI	One channel
	JTAG debugging	One channel
	UART-RS422	One channel
PS end	DDR	DDR3*2 4Gb
	QSPI Flash	512Mb
	EMMC	8GB
	SD Card	16GB SD card
	RS232	Two channel RS232
	USB	One channel USB2.0, one channel RS232 transfer USB debug port
	Internet	one channel RJ45 Gigabit Ethernet
Size	80 mm x 76 mmX20mm	
Working temperature	Industrial -40℃ to +80℃	

3.Software



Function	Parameters of the content
The main processor	XC7Z100-2FFG900I
Software version	Vivado2018.3
Programming language	Verilog
Uboot version	U-Boot 2017.01
LINUX Kernel version	LINUX-4.6.0-g399574f
Bioptical video PL terminal image access	Through PL access to dual-channel camera video, experience the concept of line-field resolution, understand the characteristics of dual-light synchronization.
AXI bus for VDMA image transmission	Through the interaction between PL side program and PS side, understand the DMA transfer mechanism of video frame transmission, DDR cache, interrupt interactive relationship, continuous image storage and data flow mechanism of algorithm application.
ARM's LWIP network transmission experiment	C program code based on naked running how to completely present UDP/TCP, IP protocol data transceiver, network packet mechanism and transmission mechanism, image network transmission data packet protocol.
Experiment on PC transmission of dual optical video network	QT program of upper computer, how to receive image data on the network, realize the analysis of network protocol, data flow caching mechanism, display continuous image display and

	continuous receive packet interaction.

4.Application

Image tracking processing