



Model:HW

Shenzhen ZMTC Technology Co., Ltd

4K FPGA Endoscope Camera Solution
Professional medical imaging OEM solution



Introduction

4K Camera System

This product is developed based on Xilinx's FPGA platform, employing an FPGA architecture to implement 4K 60fps encoding/decoding and image processing. It features a low-latency, low-power camera and high system integration. Utilizing a modular design, it allows for rapid customization of hardware interface PCBs for customers, and includes mainstream high-speed, high-frequency interfaces such as HDMI 2.0, 12-SDI, and Lemo connectors. A PC simulation system enables full-coverage active cooling and shock-resistant design, eliminating the need for additional fan cooling.

Model: HW



Excellent
Quality

XILINX FPGA platform for low-latency, real-time medical image enhancement with high-efficiency parallel processing

Stable

All-aluminum modular heat sink – active cooling for stable and reliable performance.

Extension

4K 60fps white light image output; expandable to 4K fluorescence images.



01



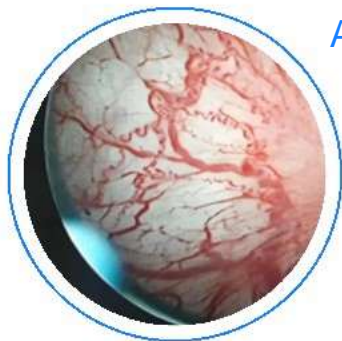
4K UHD

4K UHD images offer four times the resolution of traditional high-definition camera, clearly displaying even minute mucosal lesions as small as 0.1 millimeters, resulting in more precise detail.

Color correction
algorithm

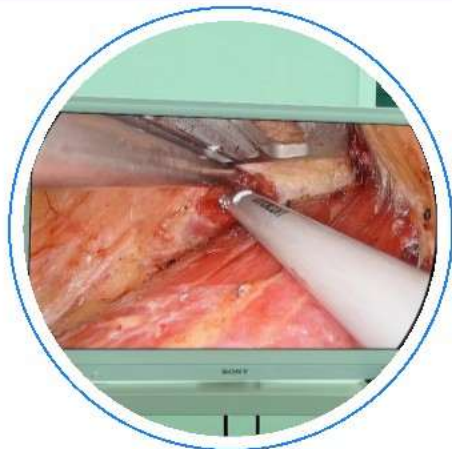
02

18-axis color phase matrix can accurately distinguish blood vessels, cavity background, and structures such as arteries/veins.

Structure Enhancement"
Algorithm

03

Retinex series algorithms optimize matrix decomposition to enhance details and suppress noise, specifically targeting the characteristics of endoscopic images.

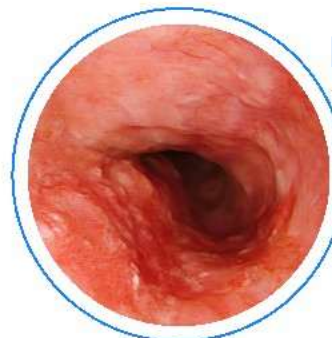


01



Adaptive Smart Exposure

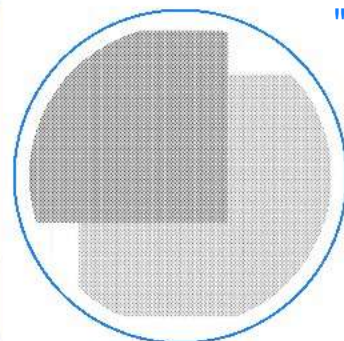
The system is specifically designed for endoscopic environments, utilizing adaptive exposure and FPGA millisecond-level parallel processing, offering strong adaptability to various surgical scenarios. Changing to different endoscopes requires no adjustment of menu parameters, freeing up the doctor's hands.



"Wide Dynamic Range" Algorithm

02

Multi-exposure technology utilizes radiation to simulate the reflection characteristics of light on the surface of tissue, achieving highlight suppression and shadow compensation.



"Denoise" algorithm

03

The super-resolution fusion algorithm not only weakens the fiber optic mesh stripes but also preserves the texture details of the endoscopic image.



4K Camera Head

Decoupled design prevents camera from overheating; Sony native 1/1.8" CMOS sensor.

Low power consumption

Silicone outer sheath paired with LEMO connector Supports high-temperature and high-pressure sterilization

High temperature and high pressure



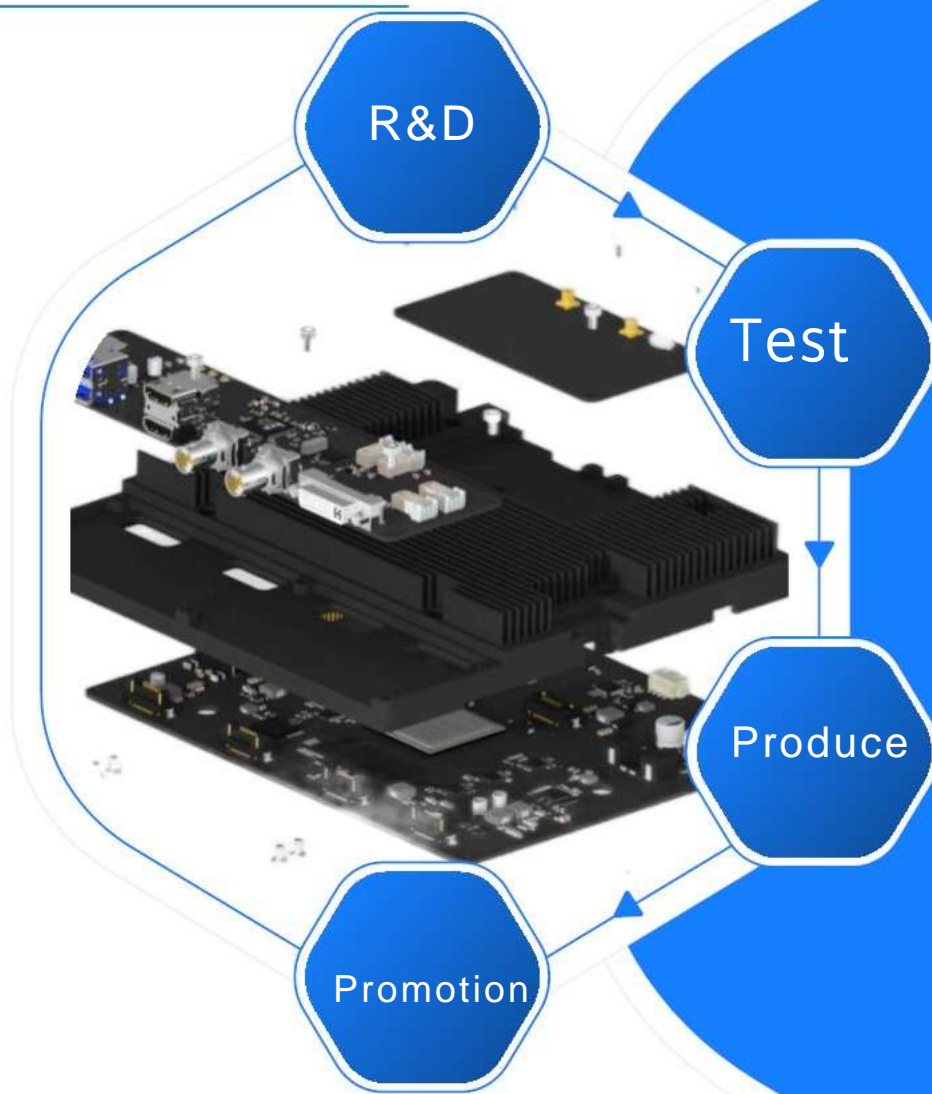
Waterproof IP68

Waterproof rating up to IP68, support immersion disinfection

Low-temperature plasma

Special process for handle shell Japanese coatings can support low-temperature plasma sterilization.

4K Image Processing System



1. USB interface and recording function :

Two front-facing USB 3.0 ports and two rear-facing USB 3.0 ports, supporting 8-megapixel photography and 4K video recording

2. Multiple output ports:

Supports simultaneous 4K Ultra HD and 1080P HD output.
Two HDMI 2.0 outputs provide 4K 60fps real-time video.
Two 12G SDI outputs provide 4K 60fps real-time video.
One DVI output provides 1080P 60fps real-time video.

3. External communication control method :

The menu can be controlled via USB mouse, LCD touchscreen, or keypad. An HCOM serial port is reserved for external communication, allowing for linkage with external devices such as light sources and insufflators.



Camera Head

Sensor	1/1.8" Sony CMOS
Effective pixels	8 Megapixels
Output resolution	3840*2160px
Camera Head Button	4 customization
Waterproof	IP68
Disinfection methods	High temperature and high pressure, hydrogen peroxide low temperature plasma, ethylene oxide

FPGA Image Algorithm

Color adjustment	Support
Image enhancement	Support
Dark area improvement	Support
Remove moiré patterns	Support

Camera Host

Menu function	Department, White Balance, Brightness, Chroma, Sharpness, Saturation, Contrast, Dynamic Range, Contour Enhancement, Gain, Gamma, De-grid, Photo, Video, Zoom
Video format	MP4
Photo format	JPG
Encoding technology	H265

Performance indicators

Signal-to-noise ratio	55dB, tolerance -20%.
Luminance response frequency	The linear fit coefficient is not less than 0.98.
Spatial response frequency	MTF30%=83C/o MTF50%=69C/o
Modulation Transfer Function (MTF)	Horizontal MTF50 = 5207 LW/PH (602LP/MM)
Output	2x HDMI2.0, 2x 12G SDI, 1x DVI4x , USB3.0, , 1x RJ45



Contact Us



Tel

+86 13728622442



Mail

zhupz@zmtc-tec.com



Website

www.zmtc-tec.com



Address

2nd Floor, ShengBo
Industry Zone, Long
Hua District, Shen
Zhen, Guang Dong
Province, China