VL8 remote monitoring and safety warning system for locomotive operation

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Part I

System Overview

1.1 System Overview

VL8 locomotive remote video security monitoring system is our latest high-definition video monitoring system, featuring high-definition video recording, video storage, and video playback in one, with 4G, GPS, and other functions to achieve real-time locomotive positioning and image data upload, download and other functions.With this system, remote control (reserved) and local forensics can be achieved, which will have a tremendous positive impact on the driver and passengers in terms of standardized operation and safety monitoring in the vehicle.

◆ Remote auditing

Timely discover violations and stop them, reduce the workload of inspectors and improve work efficiency. Supervise the drivers and passengers to carry out standardized operations such as hand-over-eye, shouting and answering, and patrolling on the way.
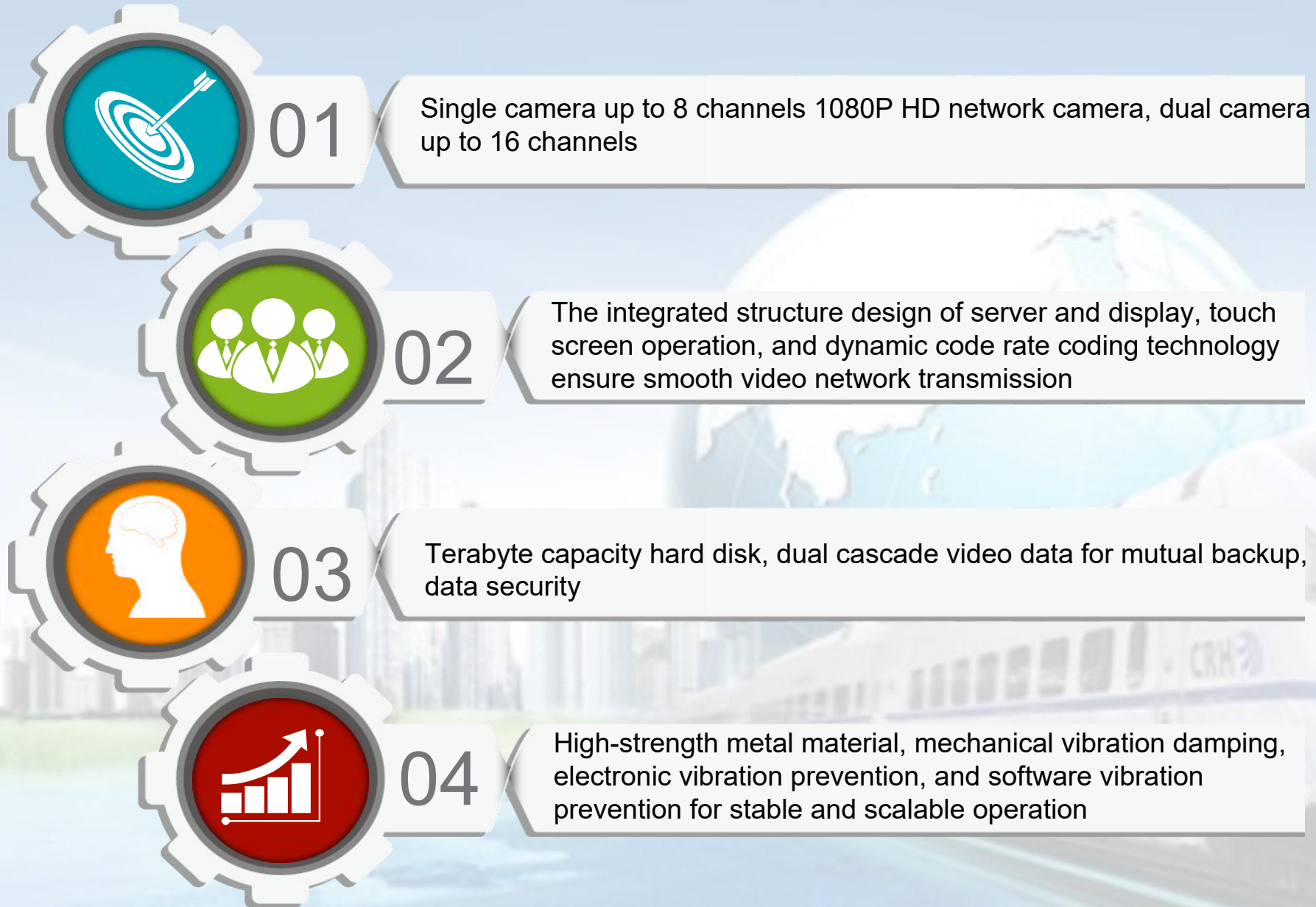
◆ Auxiliary lookout

The locomotive is operated with no dead space for the driver and crew; simultaneously, it enables the driver and team to monitor the operating status of each essential part of the locomotive in real-time, effectively solving the problem that a single driver cannot conduct inspections.

◆ Habit analysis, standard specification

Through audio and video image playback, we can accurately grasp the actual operation of the driver and crew, analyze the habitual problems of the driver and staff in the process of operation, and understand the situation that cannot be grasped in the daily additions, which is conducive to standardizing the standardized procedure of the driver and crew. And timely and practical information on the safety of relevant locomotive operations to further develop scientific and reasonable preventive measures.
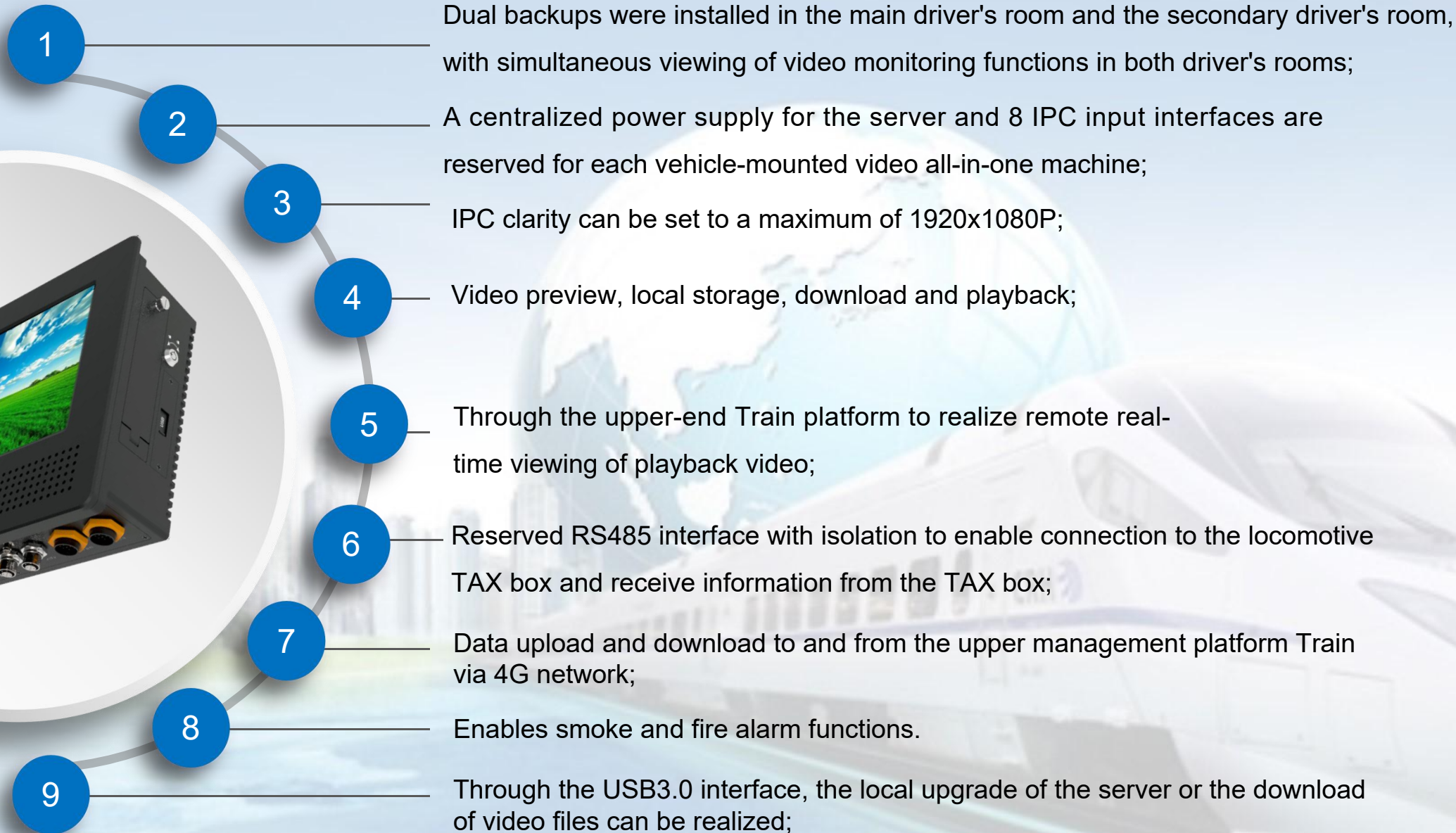
1.2 System advantages

01 Single camera up to 8 channels 1080P HD network camera, dual camera up to 16 channels

02 The integrated structure design of server and display, touch screen operation, and dynamic code rate coding technology ensure smooth video network transmission

03 Terabyte capacity hard disk, dual cascade video data for mutual backup, data security

04 High-strength metal material, mechanical vibration damping, electronic vibration prevention, and software vibration prevention for stable and scalable operation

1.3 System functions

1. Dual backups were installed in the main driver's room and the secondary driver's room, with simultaneous viewing of video monitoring functions in both driver's rooms;

2. A centralized power supply for the server and 8 IPC input interfaces are reserved for each vehicle-mounted video all-in-one machine;

3. IPC clarity can be set to a maximum of 1920x1080P;

4. Video preview, local storage, download and playback;

5. Through the upper-end Train platform to realize remote real-time viewing of playback video;

6. Reserved RS485 interface with isolation to enable connection to the locomotive TAX box and receive information from the TAX box;

7. Data upload and download to and from the upper management platform Train via 4G network;

8. Enables smoke and fire alarm functions.

9. Through the USB3.0 interface, the local upgrade of the server or the download of video files can be realized;

Part II

System Components

2.1 System Components

Pickups Driver's cab camera 1 Driver's cab camera 2 Road camera 1 Road camera 2

TAX Box

4G Antenna

Video surveillance server

Monitor

Smoke sensor 1 Smoke sensor 2 Smoke sensor 3 Smoke sensor 4 Smoke sensor 5 Smoke sensor 6 Smoke sensor 7
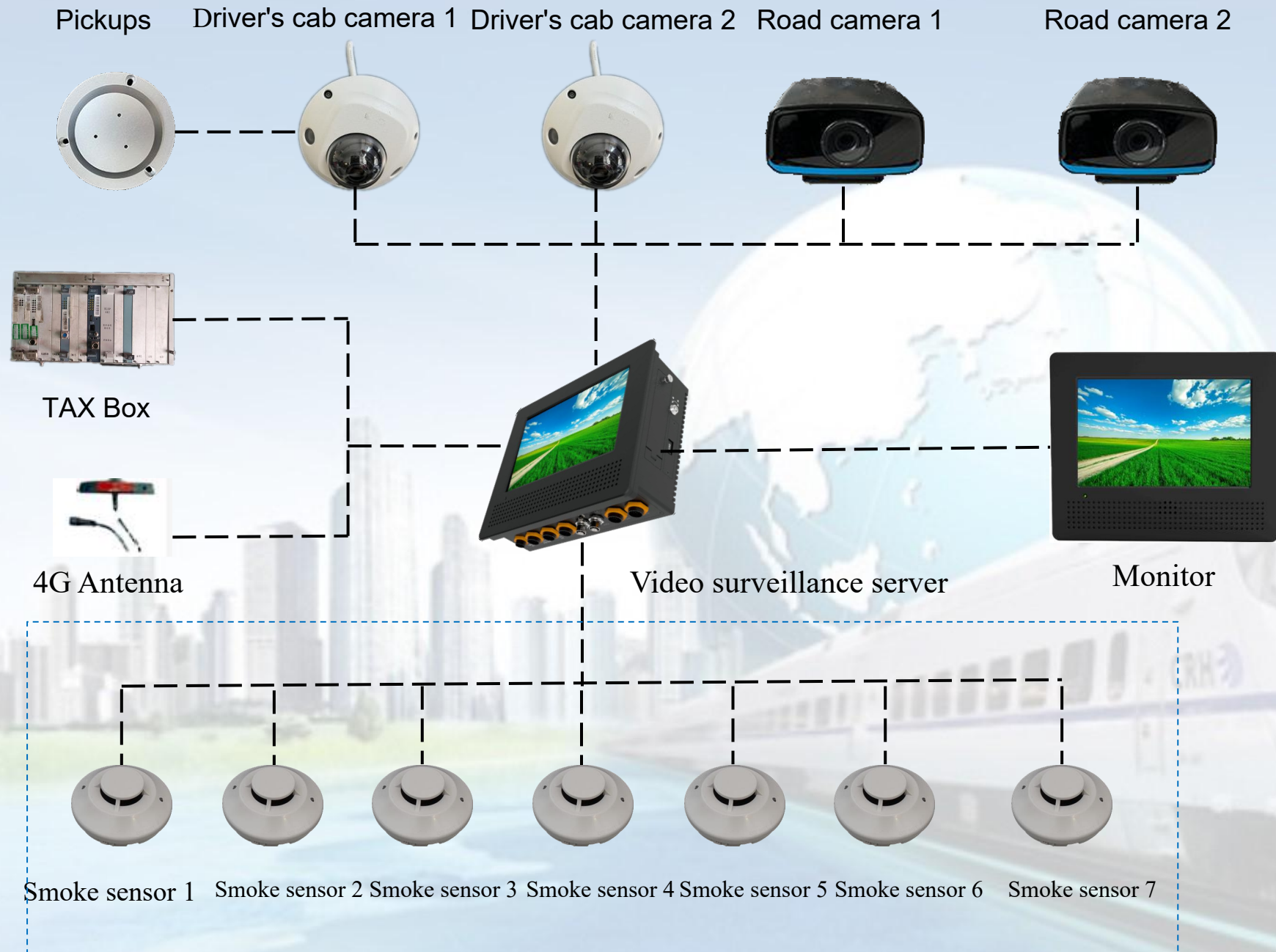
2.2 video surveillance server

Technical items		Technical specifications
Product series		VL8
Function Overview		Preview, video, replay, webcast, location
System	Operating systems	N9M
	Control mode	Touch screen, mouse
Video	Input	8-channel 1080P IPC
	Output	10.1" monitor
	Total resources	240fps
Audio	Input	8-way
	Output	1 way
Show	Show split	1/4/9/16 screen display
	Screen display	GPS information, alarms, device information, software version, recording status
Video	Video and audio compression format	H.264
	Image resolution	1920x1080
	Video mode	Automatic recording
Playback	Playback channel	Supports local single-channel playback, PC software single-channel, and 4-channel playback
Network	4G	4G all-network support
Location	GPS	External GPS module
Storage	Hard Disk	1 x 2.5" SATA interface
Interface	USB	1 x USB 3.0 port
Power supply	Input	DC110V (DC67-143V)
	Output	24V
	Power consumption	150W
Physical properties	Dimensions (WxHxH)	278*227*90mm (without cable connector)
Environment	Working temperature	-40℃- +70℃
	Working humidity	8%-90%

2.3 System Overview

VL3

VL5

VL8

VL8-F

110V

VL8 video surveillance server

24V

VL8-J1

VL8-J1-F

VL3-J1

VL3-J1+ Fireproof
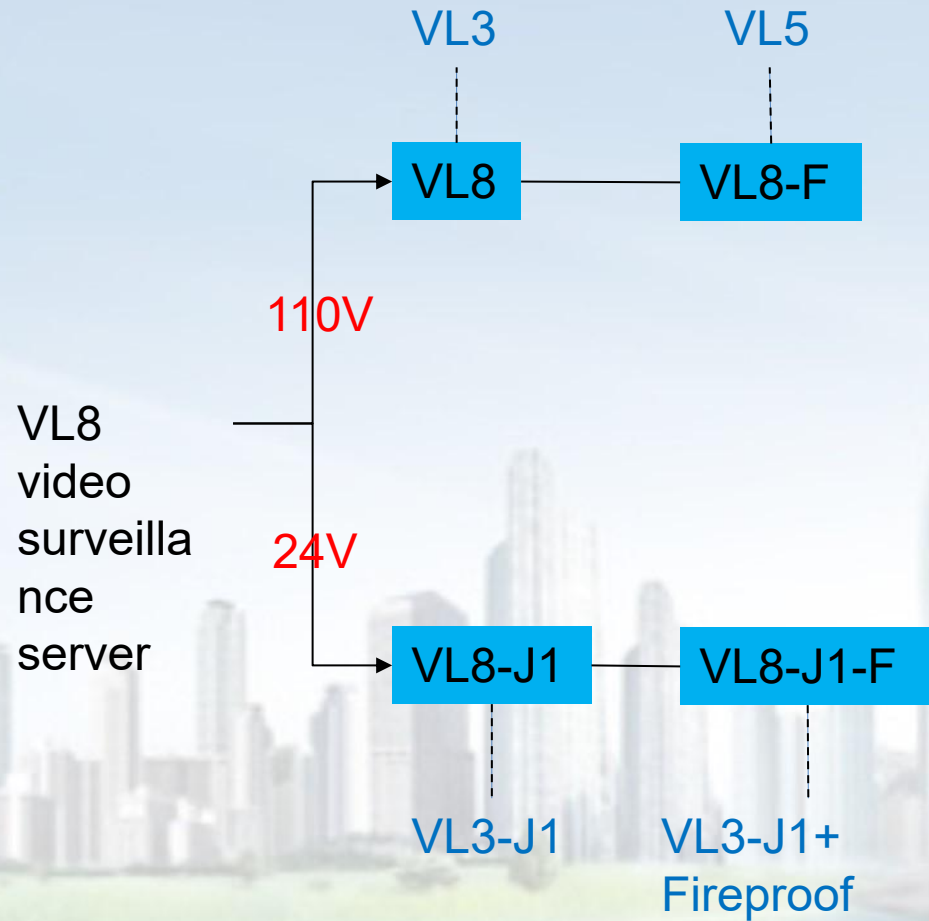
Suitable for all kinds of 110V locomotives, including DF11,DF8B,DF4D,SS8,DF7 etc.

Suitable for construction vehicles, railcars, etc., including JW-4, JW-4G, JZW-4, DA6, DX2, etc.

2.4 System Components-Road Cameras

Item		Technical specifications
Cameras	Lens	12mm
	Lens adjustment	Horizontal: -20°~20°; Vertical: -15°~25°
	Field of view	24.2° horizontal, 13.7° vertical, 27.6 diagonal
Compression standards	Video Compression Standard	H.264、H.265
Image	Max. image size	1920 × 1080
Interface	Interface	Communication interface: Amphenol ZSE02 female Power supply interface: Q14K2APJS, female
General specifications	Working temperature and humidity	-40℃~75℃,Humidity less than 95% (non-condensing)
	Power supply	DC 9~36V
	Power consumption	5W MAX
	Protection class	IP68

2.5 System Components - Driver's Cab Camera

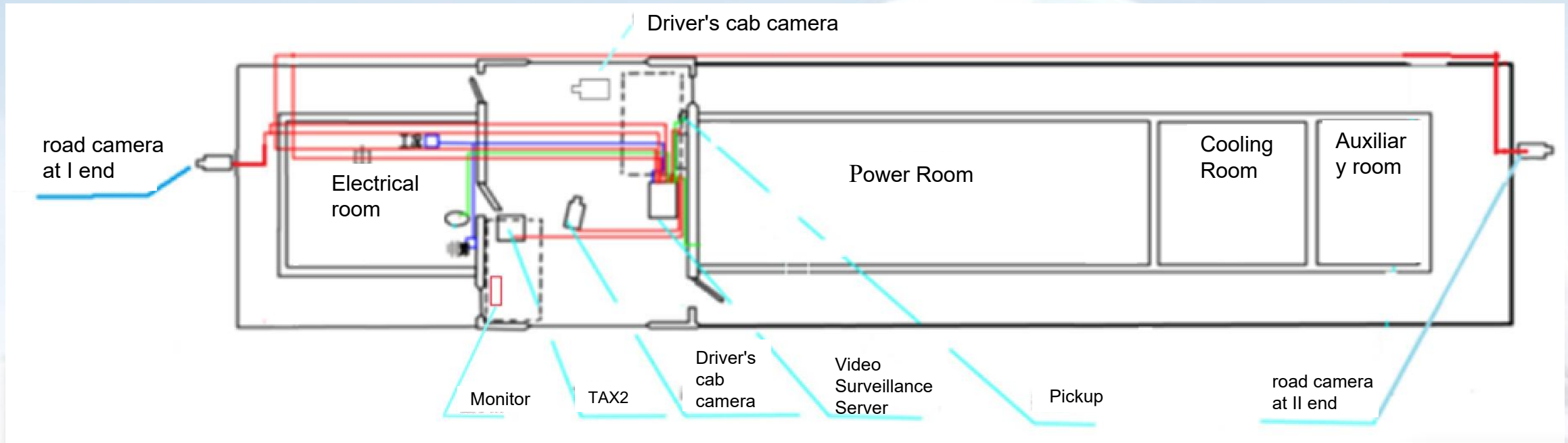| Item		Technical specifications
Cameras	Lens	2mm
	Field of view	126° horizontal, 73° vertical, 144° diagonal
Compression standard	Video Compression Standard	H.264
Image	Max. image size	1920 × 1080
Interface	Interface	Communication interface: Amphenol ZSE02 female Power supply interface: Q14K2APJS, female Pickup interface: RS765-12, male
General specifications	Working temperature and humidity	-40°C~75°C, humidity less than 95% (no condensation)
	Power supply	DC 9~36V
	Power consumption	5W MAX
	Protection class	IP67

2.6 Pickups

Pick-up area	5 - 100 sqm
Audio transmission distance	3000m
Sensitivity	-30dB
Freq. response	20Hz ~ 20kHz
Pointing properties	Omni-directional
Signal-to-noise ratio	80dB (1m 40 dB source SPL) 50dB (10m 40 dB source SPL) 1KHz at 1 Pa
Dynamic range	104dB(1KHz at Max dB SPL)
Max. sound pressure	120dB SPL （1KHz， THD 1%）
Output resistance	600 Ohm unbalanced
Output signal magnitude	2.5Vpp/-25db
Microphone	Waterproof high fidelity silver plated diaphragm condenser microphone.
Signal processing circuits	ALC automatic level control, high-speed DSP digital signal processor, AGC automatic gain control
Waterproof properties	IP67
Protection circuit	30KV Air contact ESD, lightning protection, reverse polarity power protection
Drive capability	Built-in preamplifier circuit for direct headphone driving
Connection	3 leads (power, audio, common ground)
Transmission cable	3 core 0.5mm² RVVP shielded cable
Supply voltage	DC regulated power supply DC 12V (9V-18V)
Supply current	60mA
Operating ambient temperature	-25℃ ~ 70℃
Colour	Silver
Shell material	Metal
Dimensions	80mm×20mm
Weight	150g
Conformity	EU CE standard, US FCC certification, ISO9000 quality certification system

2.7 System Components - Installation Diagram

Thanks for your time!