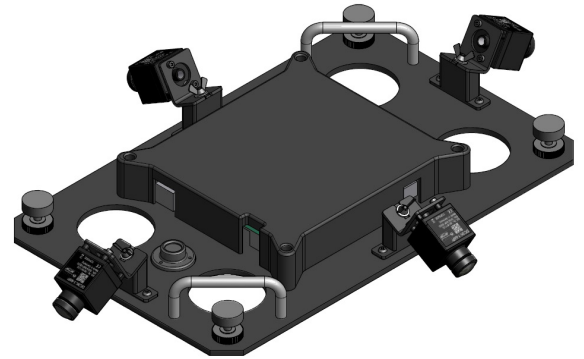


Area View Kit – DC-AVK

The Area View Kit (AVK) consists of 4 HDR CMOS cameras, an automotive Power-over-Ethernet (PoE) switch and the necessary accessories. It allows to define the right camera positions over the desk and at the application target as well as to determine the system requirements.



Features

- 4 Ethernet based cameras
- Automotive quiet wire PoE switch
- Adjustable camera positions
- "Free" 360° flight
- Programmable virtual viewing positions
- Fixed focus optics
 - HFOV standard = 190°
- Water tight optic with anti-scratch and anti-fog coating

Applications

- Area View Kit with both metal plate with fixed angles (for desktop demos) and free selectable positions (through vacuum cups for vehicle mounting) for camera based area view applications:
- Heavy trucks
 - Fork lifters
 - Agriculture equipment
 - Mining machines

The Area View Kit is the latest technology of driver assistance systems with vehicle cameras. Designed to increase safety and comfort through improved situation awareness it supports the principle of accident avoidance. AVK meets the rising demand for a simple and robust system for automotive, industrial and safety markets.

The Area View Kit technology is offered as software component (Library) for various embedded platforms and operating systems. By enabling the use of modern standard 3D acceleration GPUs it provides a high level of performance and portability while minimizing system resources

usage, in particular CPU load. It utilizes the generic industry proven OpenGL (ES) API for main rendering tasks and adapts easily to a range of hardware platforms.

Besides the well-known Top View or Bird View, a single viewing perspective from exactly above the vehicle, the Area View Kit supports any viewer position and viewing angle from outside of the vehicle, i.e. full 360° area view. The viewing position can be changed on-the-fly or by selecting one of several predefined viewing positions. The Area View Kit builds on years of experience in area view technology and offers a very high

level of flexibility and customizability to cope with specific application and system requirements often found in special vehicle applications such as construction machines. Designed for integration in modern embedded real-time video processing systems and providing well defined interfaces it integrates easily within the customers software system, e.g. from video input and application layer point of view. The multi-platform architecture allows porting to several operating systems.

Area View Kit – DC–AVK

Software features

- Almost completely GPU based
 - No CPU load in steady state
 - Only minimal usage of CPU during switching view
 - Easily integrates into existing products where the GPU is underused
- Multi-threaded operation
 - Separate thread for AVK core
 - Separated memory
 - Asynchronous operation
 - Eliminates unnecessary screen redraws
- Scalability and portability
 - OS agnostic
 - Scales from single-core embedded CPU to multi-core desktop PC
 - Adapts the graphics quality to available resources
- Bandwidth reduction techniques
 - Uses hardware extensions to avoid data copying
 - Optimized for low throughput DDR memory
- Layered structure
 - Allows integration of any video source
 - Provides interface for external sensors

Rendering

- Takes advantage of OpenGL (ES) 2.0 rendering features
- High render quality
 - Texture filtering
 - High polygon count
 - High definition camera support
 - Seamless stitching through quality blending
- Dynamic environment model, changeable on-the-fly
- Animated and freely adjustable observer positions
- Freely exchangeable 3D vehicle model

Integration

- Low resource consumption
- No window system required
- Small core library written in C
- Reference demo and evaluation application based on Area View Kit core as with application source code in C++
- HMI independent architecture
- Camera system agnostic
- No limit on camera count (within platform resource constraints)

Resource usage

The actual resource usage of the Area View Kit (AVK) depends highly on the camera and display systems used and the 3D model complexity. A typical AVK example includes 4 IP MJPEG cameras, combined 80 Mbit data rate @30 fps and 1 Mpx resolution, low polygon car model, 1280x1024 screen resolution at 60 Hz refresh rate implemented on i.MX6 Quad.

CPU usage

- 3-6 GFlops (proportional to pixel amount depicted on screen)

RAM bandwidth

- 4 x 2 MB/s Read/Write (4 cameras MJPEG data)
- 4 x 45 MB/s Read/Write (4 cameras RAW data)
- 120 MB/s Write, 240MB/s Read (frame buffer & display)
- 300 MB/s Write, 420MB/s Read in TOTAL

RAM consumption

- 4 x 10 MB for camera data buffers
- 2 MB for 3D environment and car model
- 18 MB for camera video textures
- 60 MB in TOTAL

PC requirements

- Processor with 2.4 GHz
- Intel HD graphics family
- 4 GB RAM
- 500 GB memory, AVK requires 1.8 GB

Area View Kit – DC-AVK

Technical data – Area View Kit

| Parameter | |
|------------------------------------|---|
| Camera | 4 x DCK3-1-EAP |
| Band width camera | ~60 MBit per sec |
| Band width switch | ~250 Mbit per sec |
| Switch | KSZ8795CLX Integrated 5-port 10/100 Layer-2 switch with Gigabit uplink New generation switch with four MACs, one GMAC (for uplink) and four PHYs that are fully compliant with the IEEE 802.3u standard 10/100Base-T/TX switch system which combines a switch engine, frame buffer management, address lookup table, queue management, MIB counters, MAC, and PHY transceivers Micrel LinkMD® cable diagnostic capabilities for determining cable opens, shorts, and length |
| Advanced switch capabilities | IEEE 802.1q VLAN support for up to 128 active VLAN groups (full range 4096 of VLAN IDs) Support 802.1x port-based security and MAC-based authentication via access control lists (ACL) |
| Mounting system for vehicle | 4 x vacuum cup 4 x waterproof cable (4,6m) with Rosenberger connector to RJ45 |
| Mounting system for desktop | Metal plate (206mm x 327mm) |
| Implementation of vehicle 3D model | Possible on request |
| Environment model | In real time changeable <ul style="list-style-type: none"> - optimization of fixed views - combination with distance sensors or object recognition systems (on request) - Bowl can be completely replaced with another environment model |
| Coordinate system and scales | Adapts to vehicle dimensions <ul style="list-style-type: none"> - Supports small vehicles (even table demo) as well as huge vehicles (e.g. crane) |
| Views | Any number of fixed views, with animations between the views Free flight mode |

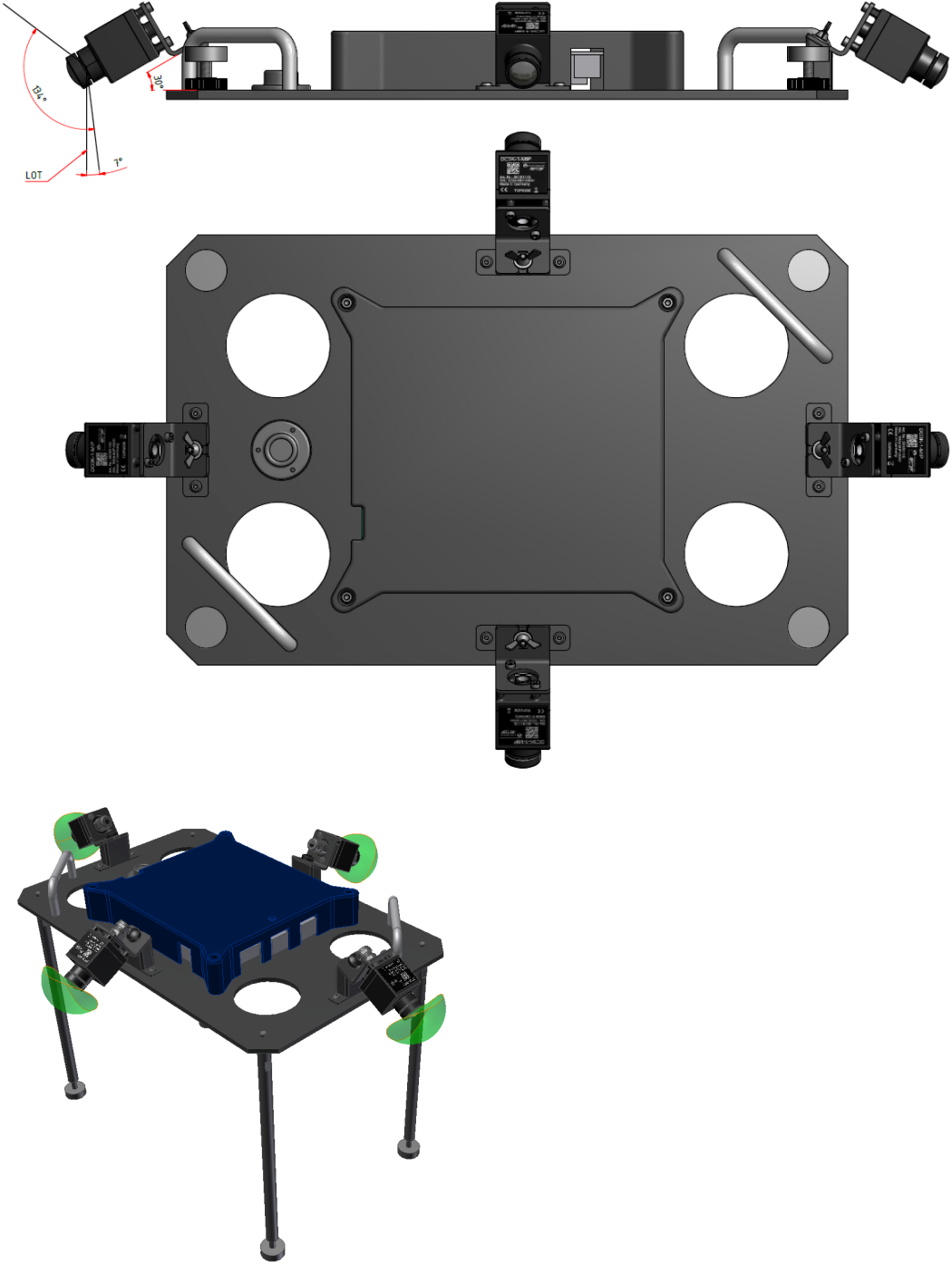
Technical data – camera

| Parameter | |
|--------------------------|--|
| Power supply (PoE) | $V_{DC\ IN - NOM} = 12\ VDC$ |
| Current consumption | 105 mA @ 12 VDC <small>NOM and per camera</small> |
| Operating temperature | -40 °C ... +85 °C |
| Sensor type | 1/3 inch HDR-CMOS sensor Omnivision = OV10635 |
| General camera parameter | Automated gain control (AGC) Wide dynamic range (WDR) Automated white balance (AWB) Shutter: Electronic rolling shutter (ERS) |
| Band width | ~60 MBit per sec and camera |
| Data interface | MJPEG Scalable data rate (15 ... 70 MBit/sec) Compression factor: 500/(15 ... 70 MBit/sec) 30 fps |
| Format video stream | UDP |

Area View Kit – DC-AVK

Physical dimensions

Metal plate (206 x 327 mm) for desktop application



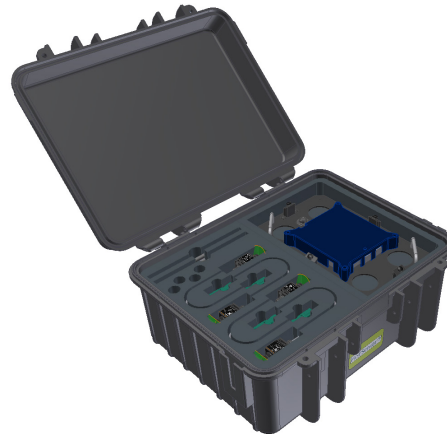
Area View Kit – DC-AVK

Physical dimensions (cont.)

Vacuum cups for vehicle application



Area View Kit outdoor case



Ordering information

| Order ID | Product – ID | Description |
|------------|----------------------------|--|
| 56-7011-00 | DC-AVK-A-190-IRC-CCA-HSA-O | Area View Kit (outdoor case) – 4 cameras + 4 cables (4,6 m) – Switch + power supply – Network cable (2 m) – Bubble level – Metal plate for desk application – 4 vacuum cups for vehicle application – Basic software (for Windows-PC) |
| 56-8410-00 | DC-AVK-A-SU-SUP | Initial start-up support |

Contact

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