TYPICAL APPLICATIONS

ARH ANPR/LPR technology: CARMEN® and ARH imaging devices help you fight against unlawful activities, provide access, organize data in real time and make everyday life easier and safer through any traffic related application. Some typical utilizations and benefits are described below.

INTELLIGENT TRAFFIC SYSTEMS

**Toll collection**
Integrating CARMEN® into open road systems allows automated toll collection in free flowing traffic.

**Journey time measurement**
CARMEN® can easily identify the same vehicle at two or more points on the road, which the system can use for calculating travel time and average travel speed.

**Congestion charging**
CARMEN® allows automated identification and charging of city drivers as they enter or leave a payment area.

PARKING AND ACCESS CONTROL

**Parking revenue systems**
Integration of CARMEN® into any parking revenue system allows the setup of ticket-free systems with fully automated operation.

**Access control**
CARMEN® can be used to identify and verify whether a certain vehicle is authorized to access a restricted area.

**Airport and harbour logistics**
All vehicle plates and container codes can be identified by using CARMEN® to improve security and to reduce waiting time at the gates.

LAW ENFORCEMENT

**Speed enforcement**
By using instant speed measurement or section speed calculation between two or more points, CARMEN® and SpeedCAM can efficiently help identify speeding violations.

**Bus lane – red light enforcement**
CARMEN® is a highly efficient tool to help police stop violators driving in bus lanes or running red lights.

**Traffic security monitoring**
Fixed and mobile systems powered by CARMEN® ensure continuous monitoring of high traffic areas.

HOMELAND SECURITY AND COMMERCIAL VEHICLE MONITORING

**Border control**
Used at numerous border control points, CARMEN® provides an efficient solution in the fight against terrorism. By monitoring and registering traffic in diverse applications, CARMEN® and ARH cameras can be valuable tools helping to protect your country and to preserve national security.

**Commercial vehicle applications**
CARMEN® can effectively help commercial organizations in a large number of applications such as gas station payments, hotel check-ins, and weigh station systems. It can also serve as a great marketing tool that logs frequent customers or users.
THE ANPR/LPR PROCESS

WHAT IS ANPR/LPR?
Automatic Number Plate Recognition/License Plate Recognition (ANPR/LPR) is also known as Car Plate Recognition (CPR) or Automatic Vehicle Identification (AVI). ARH’s flagship ANPR/LPR technology is CARMEN®.

ANPR/LPR is a traffic surveillance method based on optical character recognition (OCR). A specific OCR algorithm processes captured images or video footage to recognize the plate characters. ANPR/LPR can be implemented in any traffic related application using either an existing CCTV/IP camera system or dedicated ANPR/LPR cameras, which ensure high recognition rates and true 24/7 operation.

HOW DOES ANPR/LPR WORK IN PRACTICE?
The operation of any ANPR/LPR system can be divided into three main steps. It is important to highlight that CARMEN® ANPR/LPR technology provides a fully adaptable solution that can be seamlessly integrated with any existing workflow.

1. Detection & image capturing
At the front end of any ANPR/LPR system there is a camera that captures images of the plates. The camera plays an important role in the ANPR/LPR process as the quality of the captured images highly determines the overall performance of the system. The best results are achieved by using specialised cameras designed for ANPR/LPR. ARH offers a wide range of dedicated ANPR/LPR cameras that offers seamless compatibility to any ANPR/LPR system while boosting its capability to withstand every adverse environmental condition that may be encountered in the field.

2. Plate recognition
The main software aspect of an ANPR/LPR system is reading the plate text from the captured images. This automated recognition is made of several steps, including image normalization and enhancement, detection of the vehicle plate and distinguishing of plate characters. The final step is taken by the OCR algorithm that recognizes the individual characters.

The CARMEN® ANPR/LPR is the world leader in ANPR software, and it’s a result of over 22 years of continuous development. It facilitates country-independent recognition, reading of multiple plates from one image, color recognition, state or country identification, accomplishing all of this at an extremely fast processing speed.

3. Data processing
Besides the characters of the vehicle plate, CARMEN® also returns plenty of additional information, such as an image with the recognized plate(s), the confidence level assigned to each character as well as the whole plate, the identified country or state code, along with plate colors and position. With all this information in hand, cars can be quickly allowed or denied entry to a restricted parking areas based on a predetermined list. Law enforcement can also run the recognized plate against various national or international databases within seconds.
ARH ANPR/LPR CAMERAS

There are several possible difficulties that an ANPR/LPR system must be able to cope with. While most of the problems can be resolved by using advanced ANPR/LPR software, it is the primary task of the camera to solve some common challenges related to image capturing. Typical factors that pose difficulty for cameras in vehicle plate capturing are:

- high speed of vehicles may result in motion blur
- varying ambient light conditions (total darkness, direct sunlight or shadows)
- overexposure (due to sunlight or headlight glare)

ARH has always been a pioneer in designing advanced camera solutions that are specially developed for ANPR/LPR applications that significantly reduce these difficulties.

**Easy installation, auto set-up**
The latest ARH cameras include auto setup functions making the proper adjustment very easy, even for users with no technical background. The built-in setup software is accessible via web browsers, through which adjustments can be made remotely at any time.

**Day & night operation 24/7**
High performance infrared (IR) LED illumination ensures capturing high quality images day and night. High MTBF LEDs deliver an exceptionally long service period before any maintenance is required.

**All weather conditions**
The cameras are up to IP67 rated, feature vandalism proof housing, and are manufactured using industrial components to ensure that the cameras hold up even in extreme weather conditions.

**IP connectivity, built-in processing unit**
ARH offers a wide range of IP camera models for all types of ANPR/LPR applications. Some camera models have a built-in processing unit running the ANPR/LPR inside the camera. The recognized information can be easily transmitted over an Ethernet network.

**Still images or MJPEG stream**
The latest ARH cameras not only provide still images but also an MJPEG video stream to ensure easy integration with any DVR system.

**Low power requirement**
Low energy consumption helps to reduce system operating costs and protect the environment.
ParkIT IP CAMERA FOR ACCESS CONTROL
DESIGNED FOR VEHICLE PLATE RECOGNITION

NEW GENERATION ANPR/LPR CAMERA FOR PARKING AND ACCESS CONTROL

ParkIT is a digital purpose made ANPR/LPR camera, optimized for slow speed or parking applications. As a compact camera, the ParkIT is comprised of a resistant, single sealed waterproof enclosure with a single sealed IP65 (ingress protection) rated waterproof enclosure. The camera includes a synchronized infra red (IR) LED illumination unit providing clear and sharp images during day and night. Its technical features include pan, tilt, wall mounted brackets with hidden cabling, auto day & night switching, barrier control functions (trigger in/out), and much more.

Access control (entry & exit) to restricted car park or vehicle storage areas, maximum stay car park management, pay-on-exit (POE) car park management, pay-on-foot (POF) car park management and security control or monitoring application areas can all benefit from the progressive capabilities of the ParkIT camera.

MAIN BENEFITS

• Capturing clearer day and night images to raise the accuracy rate of vehicle plate recognition
• Automating exits/entries in parking applications with barrier control capabilities (trigger in/out)
• Speeding up entry and exit times at parking areas
• Accelerating the image capturing with built-in motion detection
• Offering a simplified and user-friendly system for parking customers
• Facilitating easy integration with auto set-up wizard and simple configuration

KEY FEATURES

• Accessibility via web browsers, with embedded web server
• Automated adaptive settings, tracking environmental changes
• Auto day & night switch
• Optional megapixel resolution and color image capturing
• JPEG and MJPEG stream output, for live and buffered images
• Multiple simultaneous image display
• Remote control and setup of camera settings

Onvif: PARKING REVENUE SYSTEMS, ACCESS CONTROL, AIRPORT AND HARBOUR LOGISTICS, TRAFFIC SECURITY MONITORING, BUS LANE AND RED LIGHT ENFORCEMENT, BORDER CONTROL, COMMERCIAL VEHICLE APPLICATIONS
FreewayCAM is a versatile digital IP camera designed specifically for ANPR/LPR (vehicle plate recognition) in high speed traffic environments. FreewayCAM consistently captures high quality images in various environmental conditions: in excessive brightness from sunshine and in nighttime reflections, in freezing winter temperatures or blistering desert heat and in precipitation caused by rain, fog or snow. The unique optical module with auto-adjustable shutter time and real-time motion detection-based self-triggering ensures appropriate image capturing at virtually any speed.

MAIN BENEFITS
- Capturing high quality images day or night, even vehicles at high speeds
- Increased recognition accuracy rates
- Saving time by simplifying setup and providing unlimited remote access to control settings
- Decreasing network loads with adjustable image compression
- Easy installation, plug & play, auto-setup wizard for easy configuration

KEY FEATURES
- Built-in motion detection, accelerating hardware
- Auto day & night switch; adaptive settings to environmental conditions
- Automatic time synchronization (NTP)
- Adjustable image compression for maximum ANPR/LPR performance
- Still images (JPEG) and compressed live video streams (MJPEG)
- Powerful IR illumination with low power consumption
ARH CAM-M201

DIGITAL DAY AND NIGHT MOBILE CAMERA
FOR TRAFFIC, PARKING AND LAW ENFORCEMENT

EFFICIENT MOBILE ANPR SURVEILLANCE

ARH CAM-M201 offers the fastest and most reliable mobile ANPR/LPR performance on the market with easy installation and single cable connection. Mounted on a patrol vehicle, it is perfect for 24-hour, all-weather operation. The camera’s vandal-proof housing may be manually adjusted to any direction and its optics electronically zoomed for solid performance in roaming parking and toll enforcement, or ANPR-based crime fighting from a stationary position or traveling at regular traffic speed.

MAIN BENEFITS

• Patrol car-, roadside-, barrier- and gate-mounting
• Quick and easy installation with single cable connection
• Manual pan/tilt, electronic zoom (PTZ) and external mounting on any vehicle
• Sideway image capturing of parking vehicle plates at regular traffic speed
• Flee-flow traffic image capturing
• Adjustable image compression
• Optimized for MobilSpot®

KEY FEATURES

• Digital IP camera with embedded webserver
• IR illumination and automatic brightness control optimized for ANPR/LPR
• IP 67 rated vandal- and weather-proof housing
• ONVIF certified video; JPEG still image, MJPEG and H264 stream output
ARH CAM-S1

PORTABLE TRAFFIC ENFORCEMENT SYSTEM WITH ONBOARD ANPR/LPR AND COMMUNICATION

FLEXIBLE DEPLOYMENT, UNMATCHED PERFORMANCE

ARH CAM-S1 is the ideal traffic enforcement and monitoring system where placing permanent installations is otherwise not feasible. The device's unique ability to autonomously execute license plate recognition, vehicle speed detection, data processing and communication makes S1 unparalleled in its class. The system's one dozen preinstalled analytical and enforcement modules, portable power source and 600 m / 1970 ft daytime, 150 m / 490 ft nighttime performance permits S1 to take the place of several complex devices for traffic management and ITS.

MAIN BENEFITS

- Complete portability, autonomous operation and communication
- Quick and easy setup through the device's touchscreen
- 600 m / 1970 ft daytime, 150 m / 490 ft nighttime detection
- Onboard ANPR/LPR and data processing
- Preinstalled modules for enforcement and analytics tasks
- Certified speed detection
- Optimized for mobile traffic enforcement

KEY FEATURES

- Integrated ANPR/LPR engine
- 30x optical zoom camera with IR illumination
- Certified laser speed detection
- Built-in motion detection
- Communication, GPS, data processing inside the unit
- JPEG image/MJPEG and H.264 stream output, internal image buffer
SpeedCAM

SPEED ENFORCEMENT CAMERA
WITH BUILT-IN ANPR/LPR SOFTWARE & SDK

SMART SOLUTION WITH INTEGRATED ANPR/LPR FOR SPEED ENFORCEMENT

SpeedCAM combines intelligent vehicle plate recognition with a speed measurement radar to create a smart traffic sensor in a robust, single-sealed waterproof camera. The built-in smart camera provides an all-in-one solution for intelligent traffic monitoring and plate recognition. It includes high quality image capturing with integrated illumination, a processing unit for vehicle plate recognition, automatic self-management, and remote access. All processing is done inside the unit: images, plate texts, time, the direction of the vehicle movement, and vehicle speeds are stored in a database within SpeedCAM’s memory with easy access through a web server.

MAIN BENEFITS

- Capturing high quality images of every vehicle
- Detecting and capturing speeders, even at high speeds of up to 250 km/h (155 mph)
- Reducing the need for time-consuming manual data entry through automated vehicle monitoring applications
- The new FPGA (field-programmable gate array processor) and the H.264 compression can provide up to ten times smaller video stream, leading less network traffic and storage space
- Simple installation that requires only power supply and standard IP connection

KEY FEATURES

- Combination of an ANPR/LPR camera, IR illumination, 3G modem, GPS, processor, communication in one unit and Doppler speed radar
- Continuous and accurate speed detection and image capturing in real time, up to 30 frames per second
- Highly accurate results with the CARMEN® FreeFlow engine installed
- Auto-adjusting for different weather conditions
- Optional business intelligence providing traffic analysis
- Embedded web server, accessible via web browsers
- Auto switch between day and night modes for 24/7 operation
- Industrial-grade vandalism proof housing that also withstands all weather conditions, with IP67 rating
Portable SpeedCAM

PORTABLE SPEED ENFORCEMENT CAMERA WITH BUILT-IN ANPR/LPR SOFTWARE & SDK

SMART SOLUTION WITH INTEGRATED ANPR/LPR FOR PORTABLE SPEED ENFORCEMENT

Portable SpeedCAM combines intelligent vehicle plate recognition with speed measurement radar to form a smart traffic sensor in a single sealed, robust, and waterproof camera. The built-in smart camera provides an all-in-one solution for intelligent traffic monitoring and vehicle plate recognition. It includes high quality image capturing, built-in integrated illumination, processing unit for vehicle plate recognition, automatic self-control and remote access. All processing is done inside the unit: images, plate texts, time and vehicle speeds are stored in a database within the Portable SpeedCAM’s memory with easy access through a web-server.

MAIN BENEFITS

- Appropriate even for low infrastructure systems; no need for lane controller PC for ANPR/LPR or even communication (if 3G option is in use)
- Traffic counting, traffic analysis
- Simple installation; operates up 16 hours on single charge
- Offering higher OCR accuracy among plate-recognition-based systems

KEY FEATURES

- Built-in doppler radar and ANPR/LPR processing unit
- Continuous speed measurement and image capturing, max 30 FPS
- Vehicle classification and traffic counting capabilities
- World leading CARMEN® ANPR/LPR engine included (country-independent)
SmartCAM

ALL-IN-ONE CAMERA WITH INTEGRATED ANPR/LPR FOR ANY TRAFFIC SYSTEM

The SmartCAM is an all-in-one IP camera, illuminator and integrated computer. The built-in computer within the camera makes this a standalone product. It means that the camera itself runs vehicle plate, container code, or USDOT code recognition and other applications or database checks. The device contains a built-in industrial PC with Windows or Linux operating system. In addition, the unit also has an embedded server that allows access via web browsers. Together with the integrated computer, SmartCAM contains an integrated digital signal processor (DSP) for image acquisition, a field-programmable gate array processor (FPGA) for compression, real-time image correction and enhancement tasks.

MAIN BENEFITS

• Simplifying applications, no need for complex external operating systems, appropriate even for low infrastructure systems
• Capturing images of every vehicle, even at high speeds
• Freeing personnel by automating a wide range of traffic monitoring functions
• Saving time; with large storage, only periodic downloading is necessary
• Constantly operating around the clock, switching automatically between day and night modes
• Simple installation that requires only power supply and standard IP connection

KEY FEATURES

• Combination of an ANPR/LPR camera, IR illumination, 3G modem, GPS, processor, communication in one unit and OPTIONAL Doppler speed radar
• Proven ANPR/LPR results with included CARMEN® FreeFlow engine
• Accelerated image capturing with automatic time synchronization (NTP)
• Auto adaptation modifies camera settings as environmental conditions change
• Embedded web server, accessible via web browsers
• Traffic counting capabilities
• Traffic analysis with business intelligence option
• Industrial-grade vandalism proof housing that also withstands all weather conditions, with IP67 rating
• Ability to upload custom camera applications
The radar-equipped FreewayCAM\textsuperscript{RT}, as a hardware-triggered IP camera, is ideal for zone-targeted traffic surveillance and automatic number plate recognition (ANPR). It is uniquely designed and built for motion-activated identification and superbly functions under various environmental conditions where other cameras fail to provide similarly positive results.

The attached Doppler radar, which can be configured through the camera’s IP connection, is able to measure not just the target vehicle’s speed but also its moving direction, dimensions, and works specifically as a trigger toward the camera and its built-in processing unit (PU).

Four channels video capture card specifically developed for the CARMEN\textsuperscript{®} systems. Apart from its primary function of digitising video signals, the chip communicates with the NNC (Neural Network Controller). This co-processor functions as integrated hardware protection for CARMEN\textsuperscript{®} software. A watchdog function is another key feature of FXVD4. With its help the card can reboot computers in case of system crashes, which considerably improves the stability and reliability of stand-alone systems. The card is developed to handle both PAL and NTSC analog composite video signals, received through any of the four BNC input connectors. The switching times among the input channels of the card are 30 milliseconds, thus enabling the user to build high-speed sequential systems handling the signals of four video channels simultaneously.

ARH is well known for its high quality OEM services, which go beyond simple relabeling. ARH is dedicated to meet all customer needs and ready to design modified product versions, as ARH has always done it in the past. Some examples for customisation include color or B&W sensors, IR or white light, wide range of LED selection (15-60 degrees), shield color modification for special environments or where the camera needs to be camouflaged. Our company has many years of experience and in-house knowledge, which delivers you the benefits from our highly innovative, cutting-edge technologies, product compliance with standards, best-in-class quality, high-level cost efficiency and long-term support. ARH can turn ideas into final products within a short time.
## COMPARISON CHART

<table>
<thead>
<tr>
<th>IMAGING</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resolution (H x V pixels)</strong></td>
<td>752 x 480</td>
<td>1280 x 960</td>
<td>752 x 480</td>
</tr>
<tr>
<td><strong>Sensor</strong></td>
<td>B&amp;W, Progressive scan CMOS 1/3</td>
<td>B&amp;W, Progressive scan CMOS 1/3</td>
<td>Color, Progressive scan CCD 1/3</td>
</tr>
<tr>
<td><strong>Max frame rate (at all resolution)</strong></td>
<td>60 frames/sec</td>
<td>45 frames/sec</td>
<td>60 frames/sec</td>
</tr>
<tr>
<td><strong>Exposure control</strong></td>
<td>Global shutter, software adjustable 1/100 s - 1/30000 s</td>
<td>Rolling shutter, software adjustable 1/100 s - 1/30000 s</td>
<td>Global shutter, software adjustable 1/100 s - 1/30000 s</td>
</tr>
<tr>
<td><strong>Output format</strong></td>
<td>JPEG, MJPEG stream</td>
<td>JPEG, MJPEG stream</td>
<td>JPEG, MJPEG stream, H.264</td>
</tr>
<tr>
<td><strong>Day/night mode</strong></td>
<td>Configurable day/night mode switching</td>
<td>Configurable day/night mode switching</td>
<td>Configurable day/night mode switching</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENS</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lens type</strong></td>
<td>5.2 - 58.8 mm with high precision motorised positioning</td>
<td>5.2 - 58.8 mm with high precision motorised positioning</td>
<td>5.2 - 58.8 mm with high precision motorised positioning</td>
</tr>
<tr>
<td><strong>Optical filter</strong></td>
<td>Fixed, IR pass above 720 nm</td>
<td>Switchable: All pass / IR cut above 850 nm</td>
<td>Switchable: All pass / IR cut above 850 nm</td>
</tr>
<tr>
<td><strong>Recommended ANPR range</strong></td>
<td>3 m - 12 m (10 feet - 40 feet)</td>
<td>3 m - 20 m (10 feet - 65 feet)</td>
<td>3 m - 100 m (10 feet - 330 feet)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROCESSING &amp; I/O</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>400 MHz DSP with image processing chip (X9)</td>
<td>500 MHz DSP with image processing chip (K25)</td>
<td>500 MHz DSP with image processing chip (K25)</td>
</tr>
<tr>
<td><strong>ANPR</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>CAMEN® FreeFlow</td>
</tr>
<tr>
<td><strong>Communication protocol / interface</strong></td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTRICAL DATA</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input voltage / power consumption</strong></td>
<td>11-15 V DC, 12 W</td>
<td>24-28 V AC, 18 W</td>
<td>12 V DC, 9 W</td>
</tr>
<tr>
<td><strong>Power consumption with heating</strong></td>
<td>No additional internal heating</td>
<td>57 W</td>
<td>No additional internal heating</td>
</tr>
<tr>
<td><strong>Conformity</strong></td>
<td>CE, RoHS, FCC</td>
<td>CE, RoHS, FCC</td>
<td>CE, RoHS, FCC</td>
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</table>

<table>
<thead>
<tr>
<th>MECHANICAL DATA</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Startup temperature</strong></td>
<td>Over -20 °C (-4 °F)</td>
<td>Over -20 °C (-4 °F)</td>
<td>Over -20 °C (-4 °F)</td>
</tr>
<tr>
<td><strong>IP rating</strong></td>
<td>IP65</td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td><strong>Dimensions (L x W x H)</strong></td>
<td>328 mm x 132 mm x 100 mm (12.91” x 5.2” x 3.94&quot;)</td>
<td>440 mm x 150 mm x 262 mm (17.32” x 5.91” x 10.31&quot;)</td>
<td>240 mm x 151 mm x 74 mm (9.4” x 5.95” x 2.9&quot;)</td>
</tr>
<tr>
<td><strong>Weight (without bracket)</strong></td>
<td>1.6 kg (3.5 lbs)</td>
<td>4.7 kg (10.4 lbs)</td>
<td>1.8 kg (3.96 lbs)</td>
</tr>
<tr>
<td><strong>Weight (bracket)</strong></td>
<td>0.6 kg (1.32 lbs)</td>
<td>0.6 kg (1.32 lbs)</td>
<td>0.25 kg (0.55 lbs)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCESSORIES</th>
<th>ParkIT</th>
<th>FreewayCAM</th>
<th>ARH CAM-M201</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Illuminator</strong></td>
<td>High power IR LED, regulated, 3 modes (low, medium, high)</td>
<td>High power IR LED, regulated, 3 modes (low, medium, high)</td>
<td>High quality SMD IR, regulated, 2 modes (low, high)</td>
</tr>
<tr>
<td><strong>Radar</strong></td>
<td>N/A</td>
<td>Optional, Doppler-Radar, up to 255 km/h (158.5 mph)</td>
<td></td>
</tr>
<tr>
<td>RECOGNITION CAMERAS &amp; SENSORS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ARH-CAM S1</th>
<th>SpeedCAM</th>
<th>Portable SpeedCAM</th>
<th>SmartCAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1280 x 720</td>
<td>1280 x 720</td>
<td>1280 x 720</td>
<td>1280 x 720</td>
</tr>
<tr>
<td>2048 x 1536</td>
<td>2048 x 1536</td>
<td>2048 x 1536</td>
<td>2048 x 1536</td>
</tr>
<tr>
<td>30 frames/sec (CCD), 20 frames/sec (CMOS)</td>
<td>30 frames/sec</td>
<td>30 frames/sec</td>
<td>30 frames/sec</td>
</tr>
<tr>
<td>Global shutter, software adjustable 1/100 s – 1/30000 s (CCD), Rolling shutter, software adjustable 1/100 s - 1/30000 s (CMOS)</td>
<td>Global shutter, software adjustable 1/30 s – 1/27700 s</td>
<td>Global shutter, software adjustable 1/30 s – 1/27700 s</td>
<td>Global shutter, software adjustable 1/100 s - 1/30000 s</td>
</tr>
<tr>
<td>JPEG, MJPEG stream, H.264</td>
<td>JPEG, MJPEG stream, H.264</td>
<td>JPEG, MJPEG stream, H.264</td>
<td>JPEG, MJPEG stream, H.264</td>
</tr>
<tr>
<td>Configurable day/night mode switching</td>
<td>Configurable day/night mode switching</td>
<td>Configurable day/night mode switching</td>
<td>Configurable day/night mode switching</td>
</tr>
<tr>
<td>30x optical zoom w/motorized iris focus integrated IR filter and auto brightness control</td>
<td>5.2 – 58.8 mm with high precision motorised positioning</td>
<td>5.2 – 58.8 mm with high precision motorised positioning</td>
<td>5.2 – 58.8 mm with high precision motorised positioning</td>
</tr>
<tr>
<td>Switchable: All pass / IR cut above 850 nm</td>
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<td>Switchable: All pass / IR cut above 850 nm</td>
<td>Switchable: All pass / IR cut above 850 nm</td>
</tr>
<tr>
<td>Daytime up to 150 m / 490 ft (with CCD sensor), and up to 250 m / 820 ft (with CMOS sensor) Nighttime up to 150 m / 490 ft</td>
<td>3 m – 20 m (10 feet – 65 feet)</td>
<td>3 m – 20 m (10 feet – 65 feet)</td>
<td>3 m – 20 m (10 feet – 65 feet)</td>
</tr>
<tr>
<td>1.6 GHz Intel Atom dual core + 766 MHz ARM dual core processing</td>
<td>1.6 GHz Intel Atom + N2600</td>
<td>1.6 GHz Intel Atom + N2600</td>
<td>1.6 GHz Intel Atom + N2600</td>
</tr>
<tr>
<td>CARMEN® FreeFlow</td>
<td>CARMEN® FreeFlow</td>
<td>CARMEN® FreeFlow</td>
<td>CARMEN® FreeFlow</td>
</tr>
<tr>
<td>3G / Wi-Fi, Ethernet, 1000 Mbit/sec, 2 mini USB, RS232, SMA (for optional external 3G antenna), 12 pin user connector for peripherals, optional GPS and service port for certification</td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
<td>ARP, ICMP, TCP/IP, DHCP, NTP, FTP, HTTP, SMTP, RTP, Ethernet, 100 Mbit/sec</td>
</tr>
<tr>
<td>12-17 V DC, 50 W</td>
<td>24-28 V AC, 35 W</td>
<td>10-15 V DC, 35 W</td>
<td>24-28 V AC, 14 W</td>
</tr>
<tr>
<td>No additional internal heating</td>
<td>90 W</td>
<td>No additional internal heating</td>
<td>33 W</td>
</tr>
<tr>
<td>Over 0 °C (32 °F)</td>
<td>Over 0 °C (32 °F)</td>
<td>Over 0 °C (32 °F)</td>
<td>Over -25 °C (-13 °F)</td>
</tr>
<tr>
<td>IP65</td>
<td>IP67</td>
<td>IP67</td>
<td>IP67</td>
</tr>
<tr>
<td>361 mm x 373 mm x 227 mm (14.2&quot; x 14.7&quot; x 8.9&quot;)</td>
<td>385 mm x 243 mm x 335 mm (15.16&quot; x 9.57&quot; x 13.19&quot;)</td>
<td>385 mm x 243 mm x 335 mm (15.16&quot; x 9.57&quot; x 13.19&quot;)</td>
<td>440 mm x 188 mm x 269.5 mm (16.46&quot; x 7.40&quot; x 10.61&quot;)</td>
</tr>
<tr>
<td>10.2 kg (22.5 lb)</td>
<td>13.5 kg (29.76 lbs)</td>
<td>13.5 kg (29.76 lbs)</td>
<td>5 kg (11 lbs)</td>
</tr>
<tr>
<td>0.6 kg (1.32 lbs)</td>
<td>–</td>
<td>–</td>
<td>0.6 kg (1.32 lbs)</td>
</tr>
<tr>
<td>Integrated LED multi wavelength illuminator</td>
<td>High power IR LED, regulated, 3 modes (low, medium, high)</td>
<td>High power IR LED, regulated, 3 modes (low, medium, high)</td>
<td>High power IR LED, regulated, 3 modes (low, medium, high)</td>
</tr>
<tr>
<td>Certified laser speed detection, up to 300 km/h (186 mph)</td>
<td>Included, Doppler-Radar, up to 255 km/h (158.5 mph)</td>
<td>Included, Doppler-Radar, up to 255 km/h (158.5 mph)</td>
<td>Optional, Doppler-Radar, up to 255 km/h (158.5 mph)</td>
</tr>
</tbody>
</table>
OCR RESULTS:

- **NUMBER PLATE:** ARH 001
- **VEHICLE TYPE:** MERCEDES BENZ
- **NATIONALITY:** EU-HUNGARY
- **SPEED:** 158 MPH / 254 KMH
- **BLACKLIST:** --- NO ---
- **COLOR:** BLUE METAL
- **OWNER:** ZSOLT VANYI
- **RECOGNITION TIME:** 2013-01-12T15:19:21+00:00

- **NUMBER PLATE:** 6006 JAA
- **VEHICLE TYPE:** FERRARI
- **NATIONALITY:** KSA
- **SPEED:** 122 MPH / 196 KMH
- **BLACKLIST:** --- NO ---
- **COLOR:** RED
- **OWNER:** AHMED ABANA
- **RECOGNITION TIME:** 2013-01-12T15:19:21+00:00
CARMEN® – The ANPR/LPR engine

CARMEN® is the brand name of ARH’s ANPR/LPR technology. It refers to the CARMEN® software family that includes several ANPR/LPR software versions suitable for different application environments. CARMEN® offers a flexible API that ensures easy integration into any type of security system. CARMEN® is used by integrator companies as an OEM component in applications ranging from Intelligent Transportation Systems (ITS), law enforcement, parking systems, and traffic analysis/management systems. Each CARMEN® version uses the same ANPR/LPR engine that is regarded as the most accurate, flexible, and sophisticated ANPR/LPR engine in the world.

CARMEN® ANPR/LPR SOFTWARE VERSIONS

**CARMEN® FreeFlow**  
Applicable for reading fast moving (up to 250km/h/155 mph) and static vehicle plates, works with any digital (IP) and analog cameras

**CARMEN® Parking**  
Extended version of Parking Lane, up to 16 analog cameras for parking and access control

**CARMEN® Parking Digital**  
Designed to be used with digital (IP) or analog cameras in parking & access control applications

**MAIN BENEFITS**

- Exceptionally fast speed: processing of one image takes less than 10 ms*
- Supports both Windows and Linux platforms**
- Generic and multiple specific engines: Korean, Chinese, Arabic, Thai, etc.
- The market leader global ANPR/LPR engine

*Measured on EU plates using 2.6 GHz Dual Core CPU  
**Supported input types (analog / digital / still images / MJPEG video streams) depend on the CARMEN® version

**KEY FEATURES**

- Flexible, user-friendly API, designed to ensure easy integration
- Country-, State-, Province-, and plate type recognition
- Recognition of plate, even on some B&W images
- Hardware independent: works with any camera or still images**
- Auto-adjusts to the environment
- High tolerance of diverse plate sizes, syntaxes and distorted plate images

**OEM CUSTOMIZED ENGINE**

The neural network technology of CARMEN® gives the engine the ability to learn. ARH can meet various requests, such as reading aircraft registrations, vessel numbers, utility meters, bib numbers of sporting event participants and many other exciting demands with a branded or generic version of the software.
ARH designs, manufactures and sells both OCR software and integrated OCR devices for automatic recognition of vehicle plates, which automatically facilitate the processing of vehicle registration numbers (number plates) by computer systems.

Its success is proven by the approximately 5,500 working relationships what ARH Inc. maintains with systems integration clients across the globe, as well as the many thousands of CARMEN® ANPR/LPR systems operating worldwide. CARMEN® FreeFlow is an innovative identification technology for traffic surveillance, toll collection, traffic management and many other projects where accuracy, speed, and automation are essential objectives.

Due to its cutting-edge technology, high accuracy rate, adaptability and rapid image processing, CARMEN® FreeFlow is among the best of its class. In addition to recognizing Latin characters, the CARMEN® ANPR/LPR engine can read Arabic, Chinese, Cyrillic, and (with special training), any other types of number plates as well. The software can execute continuous vehicle plate reading even for speeds of up to 250 km/h (155 mph). This feature is especially important, for instance, in convicting speeding violations or within automatic toll collection projects, just to mention a few. CARMEN® FreeFlow is a core technology rather than a complete application, and it was specifically designed and developed to easily integrate into complex intelligent traffic applications. It is a flexible system that can be tailored to meet specific customer requirements through its comprehensive functional libraries.

THE CARMEN® FREEFLOW ANPR/LPR PACKAGE CONTAINS THE FOLLOWING ELEMENTS

- Automatic vehicle plate recognition engine
- Neural Network Controller
- Functions libraries
- Demo and test applications
- Tutorial and sample programs both in executable and source code

Optional devices:
- To achieve the highest possible recognition rate, the image quality is a key factor. ARH offers professional quality cameras specifically designed for vehicle plate recognition. Different models are available to meet all the customer requirements.
- To achieve the best image quality and to avoid incompatibility issues, CARMEN® FreeFlow can be delivered with a proprietary video capture card which also serves as a neural network controller. The system may be used on any existing PC system running under Windows or Linux.

An intelligent transportation system equipped with CARMEN® FreeFlow can provide:
- Flexible and automatic highway toll collection systems
- Better traffic flow
- Automatic access control point management
- Analysis of city traffic during peak periods
- Automation of weigh-in-motion systems
- Enhanced vehicle theft prevention
- Effective law enforcement
- Highest efficiency for border control systems, etc.
CARMEN® FreeFlow

THE ULTIMATE RECOGNITION ENGINE FOR INTELLIGENT TRAFFIC APPLICATIONS

The CARMEN® FreeFlow software is the flagship of the CARMEN® Recognition Software family. CARMEN® FreeFlow is designed to read vehicle plates of automobiles. Registration plates are the most common and obvious means of motor vehicle identification worldwide. Traffic monitoring and security, tolling and congestion charging systems, speed and journey time measurement, access control, parking management, bus lane enforcement, border control or gas station monitoring are among many other systems that can benefit from fast and accurate automatic identification and recognition capabilities. CARMEN® FreeFlow reads vehicle plates from any image source extremely fast and with outstanding accuracy. It offers country-independent recognition as well as recognition of vehicle plates written, not only in the Latin characters, but also in Arabic, Cyrillic, Chinese, Korean, Thai and many more.

MAIN BENEFITS

- Saving time and energy in data entry, automating vehicle plate reading
- Decreasing data entry errors with improved accuracy and recognition rates
- Increasing security and safety of highways and access control areas
- Raising fidelity by handling various plate sizes, syntaxes, and distorted plate images
- Allowing smooth and problem-free 24/7 operation
- Ensuring easy installation through SDK; user-friendly API

*Special ANPR/LPR cameras are available for higher quality images and recognitions rates.

KEY FEATURES

- Automatic recognition of vehicle plates in free flowing traffic
- Fast, easy, and straightforward use
- Hardware independence: compatible with any image source (analog / digital / still images / MJPEG video streams)
- Country, state or province, and plate type recognition
- Country-independent recognition including Latin, Arabic, Chinese, Korean, Thai characters, and many more
- Plate color recognition even on some B&W images
Probably the most common ANPR/LPR applications are parking and access control. In the scope of these applications a common type of vehicle plate recognition system with typical hardware configuration and system layout can be defined.

The following plate recognition example will introduce a simple, but typical, ANPR/LPR system for access control. (Note, that in most cases the ANPR/LPR system is only a part of an integrated access control system.)

The vehicle approaches the gate of the restricted area it wants to enter. There is a barrier and a traffic light showing red as an indication to stop. An inductive loop is installed at the entrance in order to sense the arrival (and the presence) of the vehicle. There is also a CCTV camera mounted to monitor the entrance.

The inductive loop, the camera, the traffic light, and the barrier are all connected to a control PC. The PC is running an access control application, which coordinates the entire operation of the system (cameras, database, and barrier). As the vehicle arrives, the inductive loop senses the event and signals to the PC: “car arrived”.

The access control application processes and interprets the signal. The access control application – via driving a frame grabber card – captures the video signal of the camera and creates a digital picture of the vehicle in the memory (RAM) of the PC.

With the digitized picture of the vehicle in RAM, the access control application requests the vehicle plate reader module to analyse the digitized picture and read the plate number of the vehicle.

After reading the plate number, the ANPR/LPR module returns this information in ASCII to the access control application. The access control application takes the vehicle number in ASCII and passes it to a database module.

The database module checks the plate number against different permission lists, and returns an “access granted” or “access denied” flag. Based on the flag, the access control application decides whether or not to open the barrier and set the traffic light green.

The access control application may also record relevant information – such as date and time of access – in the database module in order to build an access diary. After the vehicle moves away from the gate, (either by passing through or leaving), the system gets ready to start the entire process again for the next arriving vehicle.
CARMEN® Parking

THE ULTIMATE RECOGNITION ENGINE FOR ACCESS CONTROL AND PARKING APPLICATIONS

CARMEN® Parking has been exclusively developed to automatically extract and recognize vehicle plate numbers of vehicles that stop or slow down at a barrier. Vehicle plates are the most widespread and easily recognizable means of motor vehicle identification in the world today. Automatic plate reading allows CCTV based applications, parking, and access control systems to gain precision and speed in data entry, logging, record keeping, security, parking management, and much more.

CARMEN® Parking can read plates from analog imaging sources at the fastest and most accurate recognition rates possible. It provides country-independent recognition along with the capability to process not only Latin characters but also Arabic, Cyrillic, Chinese, Korean, Thai, as well as several others.

MAIN BENEFITS

• Saving time and energy in data entry by automating plate reading
• Reducing data entry errors through high accuracy and recognition rates
• Centralising registration eliminates the need for access cards or codes to system users
• Increasing safety and security of access control areas
• Boosting reliability by handling various plate sizes, syntaxes, and distorted plate images
• Allowing smooth and problem-free 24/7 operation

*Special ANPR/LPR cameras are available for higher quality images and recognitions rates.

KEY FEATURES

• Automatic recognition of analog input plate images of vehicles in static or reduced speed traffic situations.
• Fast, easy, and straightforward use
• Country, state or province, and plate type recognition
• Country-independent recognition including Latin, Arabic, Chinese, Korean, Thai characters, and many more
• Multiple-image processing with multiple sources for the same vehicle to ensure high recognition accuracy
• Plate color recognition even on some B&W images
The CARMEN® Automatic Container Code Recognition (CARMEN® ACCR) software is a dedicated version of the CARMEN® Recognition Software family. CARMEN® ACCR is created to extract and read the Container Codes of ISO containers. The ISO Container Code – defined by the ISO 6346 international standard – is the primary identification number of intermodal (shipping) containers. This code identifies the owner, the type/category of the container, as well as its unique serial number.

The capability of reading the ISO container codes of shipping containers makes harbour, port, and logistic environments much more intelligent. The CARMEN® ACCR software can help build comprehensive databases of traffic movement, automate and simplify airport, railway, or harbour operations, as well as manage border control inventory and container surveillance systems.

The CARMEN® Automatic Dangerous Goods Recognition (CARMEN® ADR) software is a special version of the CARMEN® Recognition Software family. CARMEN® ADR is developed to recognise and decipher the Hazard Identification Numbers (Kemler codes) of vehicles carrying hazardous materials. Reading of Hazard Identification Numbers (HIN) in a traffic monitoring or safety system can become highly automated, which helps maintain more safety on the roads, bridges, in tunnels, etc. wherever hazardous materials are transported. CARMEN® ADR identifies materials in transport through HIN codes that indicate primary and secondary hazards, which gives emergency responders the ability to quickly reference critical information about potential dangers. The CARMEN® ADR software offers great flexibility, as it is able to successfully recognize transport vehicle HIN codes from a variety of image sources. Manufacturers and integrators of various recognition systems will be able to receive HIN code readings with the highest efficiency and reliability.
CARMEN® DOT

The CARMEN® DOT software is a specialised version of the CARMEN® Recognition Software family. CARMEN® DOT is engineered to extract and read the DOT number of a CMV (Commercial Motor Vehicle) from captured images. All commercial vehicles have to have a unique identification number obtained from their respective Dept. of Transportation. This number is the USDOT (or DOT) number. CARMEN® DOT provides US trucking and other traffic systems with a highly accurate and responsive tool for performing automatic identification and tracking, as well as building of complex databases and inventory control systems. CARMEN® DOT enables traffic and security systems to automatically identify and verify commercial vehicles from a variety of image sources with the highest recognition accuracy rates available in the market today. The software is also capable of collecting audit, inspection, and compliance information. CARMEN® DOT returns the DOT number, date, time, and location information to CMV systems, which can run the data against key state and national databases in real time.

CARMEN® UIC

The CARMEN® Railway Code Recognition software, (CARMEN® UIC) is a unique version of the CARMEN® Recognition Software family. CARMEN® UIC is created to extract and read the UIC numbers from railway wagons. Much like commercial motor vehicles and ISO containers, railroad cars also have unique and internationally standardised identification numbers, which are called UIC numbers. This identification number on a railroad wagon or coach is called the UIC number. By recognising the UIC codes on train cars, CARMEN® UIC provides unparalleled accuracy and speed for railroad transportation applications. The software works with commercial railway systems that carry freight or passengers, and it can virtually eliminate the possibility of human error by facilitating automatic data entry and reporting for further processing. International and logistics operations can benefit significantly from implementing CARMEN® UIC which can read railroad car UIC codes from either an image or video signal with the highest accuracy possible. This enables railroad systems to access important data about the content of each freight car, along with dates and times, as well as location of the car.
# COMPARISON CHART

## GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>Automatic recognition of vehicle license plates – a number plate recognition software for various intelligent traffic systems, security and any access control environments</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>Automatic recognition of vehicle license plates – a license plate recognition software for parking, access control and similar „low speed” applications, where cars are slowed down or stopped by barriers</td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>Automatic recognition of vehicle license plates – a license plate recognition software for parking, access control and similar „low speed” applications, where cars are slowed down or stopped by barriers</td>
</tr>
</tbody>
</table>

### Supported operating systems

<table>
<thead>
<tr>
<th>Software</th>
<th>Operating System 1</th>
<th>Operating System 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>Windows (32/64 bit)</td>
<td>Linux (32/64 bit)</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>Windows (32/64 bit)</td>
<td>Linux (32/64 bit)</td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>Windows (32/64 bit)</td>
<td>Linux (32/64 bit)</td>
</tr>
</tbody>
</table>

### Supported platforms

<table>
<thead>
<tr>
<th>Software</th>
<th>Platform 1</th>
<th>Platform 2</th>
<th>Platform 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>x86_32</td>
<td>x86_64</td>
<td>ARMv7</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>x86_32</td>
<td>x86_64</td>
<td></td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>x86_32</td>
<td>x86_64</td>
<td></td>
</tr>
</tbody>
</table>

### System requirements

<table>
<thead>
<tr>
<th>Software</th>
<th>Requirements 1</th>
<th>Requirements 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>1GHz CPU</td>
<td>512 MB RAM</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>1GHz CPU</td>
<td>512 MB RAM</td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>1GHz CPU</td>
<td>512 MB RAM</td>
</tr>
</tbody>
</table>

### Licensing

<table>
<thead>
<tr>
<th>Software</th>
<th>Licensing 1</th>
<th>Licensing 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>One license per application thread, multiple license/controller is available</td>
<td></td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>One license per camera (lane), multiple license/controller is available</td>
<td></td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>One license per application thread, multiple license/controller is available</td>
<td></td>
</tr>
</tbody>
</table>

## INTERFACE

### Input

<table>
<thead>
<tr>
<th>Software</th>
<th>Input 1</th>
<th>Input 2</th>
<th>Input 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>Still image from file or memory in any image format (BMP</td>
<td>PNG</td>
<td>JPEG</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>Still image from file or memory in any image format (BMP</td>
<td>PNG</td>
<td>JPEG</td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>Still image from file or memory in any image format (BMP</td>
<td>PNG</td>
<td>JPEG</td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Software</th>
<th>Output 1</th>
<th>Output 2</th>
<th>Output 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>OCR data</td>
<td>License plate number in ASCII/UNICODE text</td>
<td>List of characters</td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>License plate number in ASCII/UNICODE text</td>
<td>Positio of the plate</td>
<td>Confidenlevel in percentage</td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>License plate number in ASCII/UNICODE text</td>
<td>Position of the plate</td>
<td>Confidence level in percentage</td>
</tr>
</tbody>
</table>

### Trigger

<table>
<thead>
<tr>
<th>Software</th>
<th>Trigger 1</th>
<th>Trigger 2</th>
<th>Trigger 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td>Can be integrated with any trigger device (recommended when recognizing from live image stream)</td>
<td>Software motion detection module is included</td>
<td></td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td>Can be integrated with any trigger device (mandatory to start the recognition)</td>
<td>Software motion detection module is included</td>
<td></td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td>Can be integrated with any trigger device (mandatory to start the recognition)</td>
<td>Software motion detection module is included</td>
<td></td>
</tr>
</tbody>
</table>

### MORE INFO:

<table>
<thead>
<tr>
<th>Software</th>
<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARMEN® FreeFlow</strong></td>
<td><img src="QR_Code_FreeFlow" alt="QR Code" /></td>
</tr>
<tr>
<td><strong>CARMEN® Parking</strong></td>
<td><img src="QR_Code_Parking" alt="QR Code" /></td>
</tr>
<tr>
<td><strong>CARMEN® Parking Digital</strong></td>
<td><img src="QR_Code_Parking_Digital" alt="QR Code" /></td>
</tr>
</tbody>
</table>
## Software & SDK

<table>
<thead>
<tr>
<th>CARMEN® ACCR</th>
<th>CARMEN® ADR</th>
<th>CARMEN® DOT</th>
<th>CARMEN® UIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic recognition of the container codes – a ISO container code recognition software for logistics systems (railway, marine, harbors and airports), supporting ISO 6346 (BIC code) and MOCO code</td>
<td>Automatic recognition of hazard identification numbers – HIN/Keimler code recognition software for various intelligent traffic systems to enhance safety of traffic and roads</td>
<td>Automatic recognition of US DOT codes of commercial motor vehicles – a USDOT number recognition software for various traffic and security systems to automatically identify and verify commercial vehicles</td>
<td>Automatic recognition of the railway vehicle ID numbers – an UIC wagon/coach number recognition software for various intelligent railroad management systems</td>
</tr>
<tr>
<td>Windows (32/64 bit) Linux (32/64 bit)</td>
<td>Windows (32/64 bit) Linux (32/64 bit)</td>
<td>Windows (32/64 bit) Linux (32/64 bit)</td>
<td>Windows (32/64 bit) Linux (32/64 bit)</td>
</tr>
<tr>
<td>x86_32</td>
<td>x86_64</td>
<td>ARMv7</td>
<td>x86_32</td>
</tr>
<tr>
<td>1GHz CPU</td>
<td>512 MB RAM</td>
<td>1 G HDD</td>
<td>free port/slot for NNC</td>
</tr>
<tr>
<td>One license per application thread, multiple license/controller is available</td>
<td>One license per application thread, multiple license/controller is available</td>
<td>One license per application thread, multiple license/controller is available</td>
<td>One license per application thread, multiple license/controller is available</td>
</tr>
</tbody>
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<table>
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<tr>
<th>CARMEN® ACCR</th>
<th>CARMEN® ADR</th>
<th>CARMEN® DOT</th>
<th>CARMEN® UIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Still image from file or memory in any image format (BMP</td>
<td>PNG</td>
<td>JPEG</td>
<td>JPEG2K</td>
</tr>
<tr>
<td>OCR data ISO Container code in ASCII text Position of the code Confidence level in percentage Confidence levels for each characters ID of the best image Country ID and dimension information (optional)</td>
<td>OCR data Hazard identification number in ASCII text Position of the plate Confidence level in percentage Confidence levels for each characters List of further suggestions for each character Individual result for each image Color of plate (optional) Location of each plate on one image</td>
<td>OCR data US DOT number in ASCII text Position of the USDOT number Confidence level in percentage Confidence levels for each characters List of further suggestions for each character Individual result for each image</td>
<td>OCR data UIC number in ASCII text Position of the UIC code Confidence level in percentage Confidence levels for each characters ID of the best image Country ID and dimension information (optional)</td>
</tr>
</tbody>
</table>

| Can be integrated with any trigger device (recommended when recognizing from live image stream) Software motion detection module is included | Can be integrated with any trigger device (recommended when recognizing from live image stream) Software motion detection module is included | Can be integrated with any trigger device (recommended when recognizing from live image stream) Software motion detection module is included | Can be integrated with any trigger device (recommended when recognizing from live image stream) Software motion detection module is included |

### Software & SDK

**ACCR**

![ACCR QR Code](image)

**ADR**

![ADR QR Code](image)

**DOT**

![DOT QR Code](image)

**UIC**

![UIC QR Code](image)
ARH recognizes the particular challenges of its partners, which they often face when trying to combine different software and hardware components from various sources. Integrated Solutions provide the straightforward answer to easily tackle such a task.

ARH INTEGRATED SOLUTIONS

More than two decades of expertise in developing a wide range of purpose-built devices and market-leading software has led ARH toward the natural progression at the present to offer its partners several unified solutions. As always, the collective know-how is strongly manifested in this new group of products, and it represents the latest technical innovations of the company.

BENEFITS OF ARH INTEGRATED SOLUTIONS:

1. SEAMLESS COMPONENT INTEGRATION:
   Since all the hardware and software components were specifically designed and manufactured to work together, ARH is also the best equipped to assure their optimal performance together.

2. FAST AND SIMPLE SETUP:
   By the time all the components arrive to their final destination, the devices are pre-installed and calibrated, so they only need final adjustments to meet local conditions and settings.

3. SINGLE-SOURCE PROVIDER:
   ARH designs, manufactures and provides customer support for all of its products. The company’s partners can always turn to a single trusted source with any question or request for assistance.

UTILIZED COMPONENTS

- **Hardware**: ARH purpose-builds all of its hardware locally and in an uncompromising quality. The company is certified by ISO 9001 standard.

- **Software**: CARMEN® engine and other ARH OCR solutions are the most recognized products in the world of license plate and document reading, and continue to return the best results in all their applications.

- **Data management**: Several of the company’s latest integrated projects have proven to be breakthrough solutions in simplified data processing and management.

- **GUI, modules, SDK**: The added value in ARH Integrated Solutions comes from intuitive GUIs, several custom modules and flexible SDKs that assist in the connection and customization of end user applications.
Globessey® Data Server (GDS), the intelligent traffic system of ARH in a combined data server and middleware, gathers information from different endpoints to make them available for various end user applications. The operators of GDS can manage the processes through a dedicated graphical interface, which is supplied along with the system.

**Main Benefits**

- Optimized traffic speed, easier toll collection, safer roads
- Support of other traffic-related agencies (parking, law enforcement, border control, tariff, tax and statistics)
- User and developer friendly; fast ROI
- Useful outside traffic-related applications where complex image- and text-based data is mass processed (international borders, shipping ports, logistics, airports, etc.)

**Key Features**

- **Data from Endpoints**
  - Standard, customizable independent data packages from endpoints
  - Central server connected via secure SSL
  - Fast IP traffic in- and outflow with xml or binary communication

- **Internal Structure**
  - Data redundancy through high-availability replication and clustered storage
  - Highly efficient image storage
  - Dynamic hardware scalability without maximum limits

- **Connection to End User Applications**
  - Simultaneous end user applications management with standard interface and SDK
  - Wide selection of premade modules available (e.g.: stolen vehicle search)

- **Graphical User Interface (GUI) Characteristics**
  - Highly effective remote operation, reflects detailed conditions in real-time
  - User-friendly display; maps and statistics
  - Search; fast and flexible with preset automation, export functions
SOLUtiON
SOLUtiON

ROADSIDE TRAFFIC MONITORING
AND DATA PROCESSING

TRAFFICSPOT®

SINGLE-GANTRY SOLUTION FOR FREE-FLOWING TRAFFIC MONITORING

Sensing and monitoring device collection installed on a single, fixed detection point (i.e.: traffic gantry or bridge) for surveillance and data gathering:
- radar
- laser
- overview camera
- DSRC antenna
- industry-leading Carmen® ANPR/LPR software.

The additional onboard processing unit intelligently computes all measured and detected data; marks each vehicle-related event with a timestamp, location and lane identification; bundles the gathered data in an encrypted package and finally sends it to a pre-designated central location.

MAIN BENEFITS
- All the necessary traffic information gathered and processed in a single location
- Ideal for toll collection, speed enforcement, journey time measurement
- Quick ROI
- Simple maintenance
- Scalability; cost effective installation and deployment

KEY FEATURES
- 100% passing vehicle detection; three separate types of detectors (radar trigger, virtual loop, laser trigger)
- 98.5%+ (TÜV-audited) detection accuracy even during heavy traffic, limited visibility and at speeds of up to 250 km/h (155 mph)
- Purpose-built hardware
- Secure data retention; continued functioning offline for at least five days
- IP-based communication
- Efficient data compression and upload
- Each necessary data set bundled in a single "event" package for ARH GLOBESSEY® Data Server
- Modular scalability for individual needs
- Monitoring and management of each components through ARH GLOBESSEY® Data Server
ParkIT® SYSTEM  ANPR/LPR CAMERA, SERVER, APPLICATION AND GRAPHICAL INTERFACE FOR PARKING AND ACCESS CONTROL

AUTOMATED, EXPANDABLE VEHICLE ACCESS CONTROL SYSTEM FOR ANY SIZE OF INSTALLATION

ParkIT® System is a complete end user access control and parking management system that is highly flexible and customizable for use from a small residential to any size of industrial, commercial or government installations – even multiple sites at once. The system components are designed and built together to achieve simple and easy integration into any access control environment without the need for programming or other specialized skills. ParkIT® System is easy to set up, simple to operate, and it permits separate user access and administration levels for straightforward operation and data management.

Components of the system are comprised of one or more ParkIT® Camera(s), the industry-leading CARMEN® ANPR/LPR engine, ParkIT® Application software, expandable server structure and customizable graphical management and user interface (GMI/GUI) for all levels. The entire secure system is encrypted and accessible through thin client or other (even mobile) IP-based connections.

MAIN BENEFITS
• Fast automated or predetermined vehicle access
• Simple ANPR/LPR-based access permission without key, card or code
• Easy installation, straightforward IP connection
• Uncomplicated graphical management and user interface

KEY FEATURES
• Unlimited expandability from one to even one thousand access points
• User-level management w/customizable interface
• License plate-based security and surveillance functions
• Black- and whitelist management
• Analytical and statistical functions
• Multi-language GMI / GUI
TYPICAL APPLICATIONS

ARH’s industry leader identity document scanners help to fulfill your business needs with easy to operate, accurate and adaptable ID data capture and ID authentication solutions. ARH provides a broad range of scanners with scalable options, as well as software that can be easily integrated to your existing workflow. The following examples present some typical applications and highlights the benefits of ARH solutions.

GOVERNMENT APPLICATIONS

Border control & immigration
Automated data crosscheck and authentication in 24/7 operation speeds up document inspection, decreases human errors from fatigue. Besides ID processing, ARH’s live fingerprint scanner provides fast and comfortable print enrollment of passengers.

Quality check during identity document issuance
Newly issued documents should pass strict quality control before being released. ARH scanners effectively assist in quality control by measuring the position and printing quality of MRZ lines and crosscheck the data of the document with the data stored on the RFID chip.

Law enforcement & criminal applications
Registering criminal data and crosschecking it with various national and international databases can be done in a few seconds. Furthermore, the live fingerprint scanner from ARH can assist in fast and forensic quality fingerprint enrollment.

COMMERCIAL APPLICATIONS

Hotel check-in
Efficient ID data capture solution ensures a fast and easy check-in process that also help hotels fulfill their guest registering obligations. The system functions as a secure closed application to protect guest information from data intrusions.

Banking / Retail
ARH provides a quick, accurate and fully compatible solution for registering client ID information, while strengthening protection against identity theft and offering easy integration to customer loyalty programs.

Casinos / Gaming / Liquor stores
Enhance any casino’s operational intelligence by automatic ID data capture and authentication that even allows an ID-based VIP system for visitors. It also increases security and reduces losses with quick and reliable age verification.

Car rental / CSP retail locations
Quick and accurate automated ID data capture & authentication means convenience for clients and better security for the business. It can reduce operational costs and losses due to ID fraud.
While identity document scanners have undergone remarkable changes over the past decade, ARH’s document scanning solutions have always represented the latest technology. The devices perform complex ID data capture and authentication, yet the simple usage and high level of automation always ensures fast and easy operation with minimal required training.

ARH IDENTITY DOCUMENT SCANNERS

Each ARH document reader combines well-designed scanner hardware with versatile software that includes a wide range of image processing, OCR, barcode reading, and authentication functions.

A TYPICAL SCANNING PROCESS CONSISTS OF THREE STEPS:

1. DATA CAPTURE:
The scanner extracts optical data by capturing various images under different illuminations, as well as data from the RFID chip – where applicable.

2. RECOGNITION:
ARH’s world-leading OCR software recognizes all text-based information in addition to data extracted from any common 1D and 2D barcodes.

3. AUTHENTICATION:
The scanner performs multiple security checks on the captured images and extracted data for high-level document validation. Performing all the steps takes only a few seconds and requires minimal user intervention.

DATA CAPTURE

- Scanning of the document starts automatically once it is placed on the scanner
- Multiple high resolution images are captured under different illuminations: visible white, IR and UV
- Textual and biometric data (face photo, fingerprint) is retrieved from the RFID chip
- All extracted data is transmitted via commonly used USB 2.0 interface
AUTHENTICATION + OCR

THE FOLLOWING DATA FIELDS CAN BE RECOGNIZED AND EXTRACTED:

AUTHENTICATION
Captured images and extracted data are validated through various security checks: the checked data sets include MRZ checksums, expiration date, UV dullness, presence of B900 ink, data integrity between MRZ vs. RFID, biometric integrity and optional special features like advanced pattern matching or JURA IPI decoding. Some of the unique security functions are described below.

BIOMETRIC INTEGRITY CHECK: FACE COMPARE
Automated cross checking of the photo from the data page and the photo stored in the RFID. This feature effectively grants protection against altered photos on the data page.

OVD VISUALIZATION, REFLECTION REMOVAL
The new Combo Reader series offers OVD (Optical Variable Device) visualization like holograms on the captured images. The Reflection Removal (RR) technology ensures that captured images are free of reflective security signs like OVDs resulting in higher accuracy and better security, and as a result.

IPI* DECODING
IPI (Invisible Personal Information) encodes personal data into the photo of the data page, linking the photo of the owner and the ID together. The IPI is invisible to the naked eye; only authorized people are able to verify it manually with special decoding lens or automatically by using ARH scanners.

* JURA JSP patented feature

SOFTWARE INTEGRATION
Each of the ARH document scanning solutions present a universal tool suitable for any application. To ensure that ARH scanners fit any custom workflow, all scanners are delivered with a versatile SDK that contains a comprehensive API for seamless integration. Since all ARH scanners use the same, unified SDK, once the integration is completed, any ARH device is compatible with the developed application.
The Combo Scan is an extremely compact and fast automated scanner designed to read and verify both national IDs and international passports by checking for counterfeiting, alteration, or forgery.

Combo Scan’s efficient image processing, optical character recognition (OCR), barcode reading and authentication functions offer numerous advantages to hotel check-in, casino, liquor store, car rental, or retail operations, as well as many other industries where identification is required. Image acquisition, optical reading and authentication are performed in a single-step, which neither requires the document to be moved nor repositioned – offering easy handling for the user. Automatic detection of IDs – e.g. driver licenses, credit cards, visas, passports, etc. – along with Combo Scan applies cutting-edge technology to the automatic recognition of IDs, in an effort to greatly reduce the time it takes to receive an accurate authentication or to perform information retrieval. This capability may potentially save several minutes per customer compared to manual data input.

**MAIN BENEFITS**

- Time saving; complete scanning process takes less than 1.0 second
- Reducing data entry errors, all information is extracted automatically
  - Identifying fake IDs, blocking minors from entering age restricted areas
  - Easy to use, P&P, no need for special training, comfortable ergonomic design
  - Seamless integration into any existing government or commercial workflow with flexible SDK
  - Highly reliable, no moving parts

**KEY FEATURES**

- Full page ID-1 and MRZ passport & visa scanning with automatic document detection
- Lay-on document scanning in an ultra-compact, stylish and ergonomic design
- High-resolution 500 PPI imaging, LED based visible white and IR illumination
- Power supply and communication via a single USB connection
- OVD visualization and Reflection Removal (RR) technology to aid OCR and verification
- Dustproof IP53 optical module
The Combo Smart document reader product line features remarkably compact full-page scanner models that extract customer and passenger data from all kinds of identification documents for verification against misuse, alteration or forgery.

The speed and precision of Combo Smart scanners provide several advantages to border control, immigration, banks, hotels, car rental companies, and many other environments where secure identity verification is essential.

**MAIN BENEFITS**

- Speedy authentication with automatic document detection; complete image capture and data reading in a single step, which only takes a few seconds
- Avoiding errors in data entry
- Easy to use; plug & play with no need for special training
- Sustaining reliability with a solid, ergonomic design and dust-proof IP53 optical module
- Seamless integration into any existing government or commercial workflow with flexible SDK
- Saving workspace with a very small footprint

**KEY FEATURES**

- Full-page scanning of passports, e-passports, visas, ID cards and driver licenses, credit cards, boarding passes, tickets, etc.
- High-resolution 500 PPI imaging
- LED-based visible white, IR and UV illumination
- OVD visualization and Reflection Removal (RR) technology
- Regular 1D and 2D barcode reading from printed documents or smartphone screens
- Modular design with options: IR, UV, RFID, magstripe & smartcard
- Compliance to ISO & ICAO standards, supports BAC, PACE, EAC, AA and PA as well as CA, TA, BAP and EAP
- Two auxiliary USB ports to connect external devices
- Automated face comparison (printed photo & RFID photo)
- SAM slots for secure certificates and digital signatures
The Kiosk Scan reader is an ultra-compact scanner that extracts customer and passenger data from both national IDs and international passports for verification against alteration, forgery or misuse. It is specifically designed for installation into self-service kiosks, e-gates, and other service desks.

The many advantages of Kiosk Scan include efficient image processing, optical character recognition (OCR), barcode reading and authentication functions, which benefit in hotel check-in, casino, car rental, retail or liquor stores, and many other environments where identification is required. The Kiosk Scan’s automatic detection of IDs can save several minutes per customer compared to manual data input – substantially reducing the time it takes to perform accurate authentication of various identity documents such as driver licenses, visas, passports, or credit cards. The image capture, optical reading, and authentication is done in a single step, without the need to move or reposition the document, which makes the device very simple to use.

**Main Benefits**

- Saving several minutes per customer vs. manual data input
- Taking only 1 to 2 seconds to complete an entire scanning process
  - Preventing minors from entering or making purchases in age restricted areas
  - Ensuring comfort with ergonomic design
  - Single-step authentication is simple to use even for inexperienced users

**Key Features**

- Ultra compact full-page ID card (ID-1) and MRZ passport/visa scanning with automatic document detection
- 1D/2D barcode reading from paper based documents and mobile phones
- Specially designed housing for kiosk integration
- Power supply and communication via a single USB connection
- Durable metal housing and no moving parts for maximum reliability
The PRM© document reader offers fast and accurate full-page scans with reading, authenticating and verifying passports, visas, electronic IDs, driver licenses and other personal identification documents. Many security operations – including border control, immigration, consulates, banks, hotels, car rental companies and any other industry where identification is required – can benefit from the PRM©'s efficient image processing, optical character recognition (OCR), barcode reading and authentication functions.

**MAIN BENEFITS**

- Speeding up authentication with automatic motion detection based single-hand operation
- Simplifying data entry and reducing errors through automatic data transfer
- Single step OCR and RFID reading for better security and higher speed regardless of chip position in passport; no need to reposition the document
- Eliminating verification errors by automated face comparison of data page photo and RFID-stored image
- Installing seamlessly into systems with SDK

**KEY FEATURES**

- Full-page, single-step passport and identity document scanning, RFID function
- High resolution, 475 PPI imaging in LED based visible, IR and UV light illumination
- Ability to read OCR lines, 1D & 2D barcodes, MRZ, VIZ and printed characters from boarding passes
- Additional 960 PPI camera offering 24 bits/pixel color or 8 bits/pixel monochrome in IR pictures
- Handling of non-standard documents with an optional extended document window
- Compliance with ISO and ICAO standards, supports BAC, PACE, EAC, AA and PA as well as CA, TA, BAP and EAP
- High color fidelity (extended color fidelity or XCF) with calibration
- Hardware-assisted reflection removal (RR) and OVD visualization
The AFS-510 is a compact live scanner for 4+4+2 flat or single-rolled fingerprint capture. It is designed for fast, forensic-quality image capture that is certified by FBI IAFIS Appendix F.

The advanced optical scanning technology and robust design provides a reliable solution for both civil and criminal application. The scanning process is fully configurable: sequence of capture, available time and required fingerprint quality can be set by the operator. The smart LED-based user interface guides the user through the entire enrollment process.

**KEY FEATURES**
- 4+4+2 flat and single rolled, forensic-quality fingerprint capabilities
- High resolution 500 PPI imaging, compliant with the FBI’s IAFIS App. F
- Large scanning plate, effective size: 3.31 × 3.03” (84 × 77 mm)
- Factory calibrated auto-capture and auto-segmentation
- Durable metal housing for heavy-duty operation
- Dual power system: via two USB ports or external power supply

**MAIN BENEFITS**
- Ideal for both large and small scale applications
- Smart interface guides users with illuminated pictograms
- Built-in signal and ergonomic design to enhance user comfort
  - Automatically checking the correct sequence and vertical position
  - Easy integration with any system through a flexible SDK

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**FINGERPRINT SCANNER**
WITH OCR SOFTWARE LIBRARY & SDK

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**AFS 510**
4+4+2 FINGERPRINT LIVE SCANNER
ENROLLMENT KIOSK

The ARH Enrollment Kiosk is a configurable, self-service data collecting station that provides complete biometric enrollment capabilities and identity document reading. It collects the face photo, ID data, fingerprints, signature, and height information of any person in a single session... in less than 30 seconds.

Collected data can be used in various applications, such as:
- Visa, ID card, passport and driver license issuing
- Issuing identification badges in secure environments, like power plants, military installations, R&D centers
- Collecting biometric data of visitors at closed events like conventions and conferences
- Enroll all biometric data of inmates at prisons

OEM PRODUCTS

ARH is well-known for its high quality OEM services, which go beyond simple relabeling. If you have not found the product you are looking for, ARH’s expert development team is happy to help you customize an existing product or build a new version.

You will benefit from our highly innovative technologies, certified product compliance with standards, best-in-class quality, high level of cost efficiency and long term support. ARH works on your behalf in R&D, software- and hardware engineering, testing and prototyping. Take advantage of ARH’s many years of experience and in-house knowledge. ARH controls all steps of the process to successfully accomplish OEM developments, while keeping up strict QA and meet specified deadlines. OEM services provided by ARH include:
- Consultation
- Design
- Integration of other OEM modules
- Prototype manufacturing
- Testing and certification
- “Train the trainer” concepts
- Mass production

ARH can turn ideas into actual final products within a short amount of time.

Definitions

OEM products are:
- Original ARH products sold under your own label
- Specially modified products
- Completely new products developed from a concept
## COMPARISON CHART

### IMAGING

<table>
<thead>
<tr>
<th>Feature</th>
<th>COMBO SCAN</th>
<th>COMBO SMART</th>
<th>KIOSK SCAN MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active scan area</td>
<td>125 mm × 55 mm (4.92” × 2.17”)</td>
<td>125 mm × 88 mm (4.92” × 3.46”)</td>
<td>125 mm × 55 mm (4.92” × 2.17”)</td>
</tr>
<tr>
<td>Illumination sources</td>
<td>LED visible white, IR (B900)</td>
<td>LED visible white, IR (B900), UV (UVA)</td>
<td>LED visible white, IR (B900)</td>
</tr>
<tr>
<td>Provided images</td>
<td>Visible, IR, OVD image, glare-free image</td>
<td>Visible, IR, UV (UVA), OVD image, glare-free image</td>
<td>Visible, IR, OVD image, glare-free image</td>
</tr>
<tr>
<td>Image formats</td>
<td>BMP, JPG, JPG2000 and PNG</td>
<td>BMP, JPG, JPG2000 and PNG</td>
<td>BMP, JPG, JPG2000 and PNG</td>
</tr>
</tbody>
</table>

### READING CAPABILITY

<table>
<thead>
<tr>
<th>Feature</th>
<th>COMBO SCAN</th>
<th>COMBO SMART</th>
<th>KIOSK SCAN MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Document Detection (ADD)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Reflection Removal (RR)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>ICAO MRZ Reading</td>
<td>ICAO compliant documents per ICAO 9303 specification Part 1, Part 1v2, Part 2, Part 3 and Part 3v2, for Type ID-1, ID-2 and ID-3 MRZ Optical Character Recognition</td>
<td>ICAO compliant documents per ICAO 9303 specification Part 1, Part 1v2, Part 2, Part 3 and Part 3v2, for Type ID-1, ID-2 and ID-3 MRZ Optical Character Recognition</td>
<td>ICAO compliant documents per ICAO 9303 specification Part 1, Part 1v2, Part 2, Part 3 and Part 3v2, for Type ID-1, ID-2 and ID-3 MRZ Optical Character Recognition</td>
</tr>
<tr>
<td>VIZ Reading</td>
<td>Available, based on user-defined fields</td>
<td>Available, based on user-defined fields</td>
<td>Available, based on user-defined fields</td>
</tr>
<tr>
<td>Contactless IC (RFID) Option</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Magnetic Stripe Option</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Contact Smart Card Option</td>
<td>N/A</td>
<td>Track 1, 2 and 3 stripes according to related ISO, ANSI and AAMVA standards</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### PROGRAMMING & INTERFACES

<table>
<thead>
<tr>
<th>Feature</th>
<th>COMBO SCAN</th>
<th>COMBO SMART</th>
<th>KIOSK SCAN MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported operating systems</td>
<td>Windows 8.1, 8, 7, Vista (32/64 bit, WHQL certified) 32/64 bit Server 2008 R2 and Server 2003 Linux Debian 6.06, 7, Ubuntu 10.04, 12.04, CentOS 6.3 and Open Suse 12.1</td>
<td>Windows 8.1, 8, 7, Vista (32/64 bit, WHQL certified) 32/64 bit Server 2008 R2 and Server 2003 Linux Debian 6.06, 7, Ubuntu 10.04, 12.04, CentOS 6.3 and Open Suse 12.1</td>
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</tr>
<tr>
<td>Software Development Kit (SDK)</td>
<td>Complete SDK including DLLs and demo programs</td>
<td>Complete SDK including DLLs and demo programs</td>
<td>Complete SDK including DLLs and demo programs</td>
</tr>
<tr>
<td>Programming languages</td>
<td>C/C++, C# Visual Basic 6.0, Delphi, VB.NET, Java</td>
<td>C/C++, C# Visual Basic 6.0, Delphi, VB.NET, Java</td>
<td>C/C++, C# Visual Basic 6.0, Delphi, VB.NET, Java</td>
</tr>
<tr>
<td>RFID functions (where applicable)</td>
<td>N/A</td>
<td>ICAO Doc. 9303 LDS 1.7, ISO 18013 (Drivers License) PKI 1.1, BAC, EAC, EAC2.0, PACE, AA, PA, TA, CA, BAP, EAP</td>
<td>N/A</td>
</tr>
<tr>
<td>Advanced Document Authentication Module</td>
<td>Data consistency checks: MRZ vs. VIZ vs. Bar codes IR B900 check</td>
<td>Data consistency checks: MRZ vs. VIZ vs. Bar codes IR B900 check</td>
<td>Data consistency checks: MRZ vs. VIZ vs. Bar codes IR B900 check</td>
</tr>
</tbody>
</table>

### MECHANICAL AND OTHER DATA

<table>
<thead>
<tr>
<th>Feature</th>
<th>COMBO SCAN</th>
<th>COMBO SMART</th>
<th>KIOSK SCAN MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (width x depth x height)</td>
<td>152 mm x 130 mm x 82 mm (5.98” x 5.12” x 3.23”)</td>
<td>178 mm x 176 mm x 146 mm (7.01” x 6.93” x 5.75”)</td>
<td>125 mm x 123 mm x 58.5 mm (4.92” x 4.84” x 2.3”)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.6 kg (1.32 lbs)</td>
<td>1.1 kg (2.43 lbs)</td>
<td>0.6 kg (1.32 lbs)</td>
</tr>
<tr>
<td>Operating temperature, humidity</td>
<td>5 °C - 45 °C (41 °F - 113 °F), 0-95 % (non-condensing)</td>
<td>5 °C - 45 °C (41 °F - 113 °F), 0-95 % (non-condensing)</td>
<td>5 °C - 45 °C (41 °F - 113 °F), 0-95 % (non-condensing)</td>
</tr>
<tr>
<td>Power supply</td>
<td>From USB, no external power supply is required</td>
<td>Universal external power supply, 100-240 V AC, 50/60 Hz</td>
<td>From USB, no external power supply is required</td>
</tr>
<tr>
<td>Compliances</td>
<td>FCC, CE, WEEE, RoHS</td>
<td>FCC, CE, WEEE, RoHS</td>
<td>FCC, CE, WEEE, RoHS</td>
</tr>
</tbody>
</table>

### MORE INFO:

#### COMBO SCAN
![QR Code]

#### COMBO SMART
![QR Code]

#### KIOSK SCAN MODULE
![QR Code]
## ID DOCUMENT READERS & BIOMETRICS

<table>
<thead>
<tr>
<th>PRMc</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>130 mm × 98 mm (5.12&quot; × 3.86&quot;)</strong></td>
<td></td>
</tr>
<tr>
<td>LED visible white, IR (B9000), UV (optional)</td>
<td></td>
</tr>
<tr>
<td>Visible, IR, UV (LVA), OVD image and glare-free image</td>
<td></td>
</tr>
<tr>
<td>BMP, JPG, JPG2000 and PNG</td>
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<tr>
<td><strong>YES</strong></td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td></td>
</tr>
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<td>ICAO compliant documents per ICAO 9303 specification Part 1, Part 1v2, Part 2, Part 3 and Part 3v2 for Type ID-1, ID-2 and ID-3 MRZ Optical Character Recognition</td>
<td></td>
</tr>
<tr>
<td>Available, based on user-defined fields</td>
<td></td>
</tr>
<tr>
<td>1D: UPC-A, EAN8, EAN13, Code39, Code128 and ITF</td>
<td></td>
</tr>
<tr>
<td>2D: PDF 417, Data Matrix, QR Code, Aztec Code</td>
<td></td>
</tr>
<tr>
<td>From paper based documents and mobile devices</td>
<td></td>
</tr>
<tr>
<td>AAMVA compliant PDF417 and IATA BCBP</td>
<td></td>
</tr>
<tr>
<td>Reading and writing contactless ICs according to: ISO 14443 Type A &amp; B, All standardized rates up to 848 kbps</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ISO 7816 Class A, AB and C, ISO 7816 &amp; EMV2 2000 Level 1</td>
<td></td>
</tr>
</tbody>
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</tr>
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<tr>
<td>ICAO Doc. 9303 LDS 1.7, ISO 18013 (Drivers License)</td>
<td></td>
</tr>
<tr>
<td>PKI 1.1, BAC, EAC, EAC2.0, PACE, AA, PA, TA, CA, BAP, EAP</td>
<td></td>
</tr>
<tr>
<td>Data consistency checks: MRZ, Bar codes, RFID IR B900 and UV dull paper check, Passports’ bearer photo vs. RFID OD32, VIZ and non-ICAO document reading (optional), Security pattern matching (optional)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRMc</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>213 mm × 173 mm × 179 mm (8.39&quot; × 6.81&quot; × 7.08&quot;)</strong></td>
<td></td>
</tr>
<tr>
<td>1.9 kg (4.19 lbs.) – actual weight may vary depending on configuration</td>
<td></td>
</tr>
<tr>
<td>5 °C - 45 °C (41 °F - 113 °F), 0-95 % (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Universal external power supply, 100-240 V AC, 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>FCC, CE, WEEE, RoHS</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAPTURE UNIT</th>
<th>AFS 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>500 PPI</td>
</tr>
<tr>
<td>Platen size</td>
<td>91 mm × 78 mm (3.58&quot; × 3.07&quot;)</td>
</tr>
<tr>
<td>Active platen area</td>
<td>84 mm × 77 mm (3.31&quot; × 3.03&quot;)</td>
</tr>
<tr>
<td>Capture</td>
<td>Automatic: single fingerprint rolls, single fingerprint flats, four finger slaps, two thumbs</td>
</tr>
<tr>
<td>LED indicators</td>
<td>Smart multicolor LED indicator system</td>
</tr>
<tr>
<td>Interface</td>
<td>USB 2.0</td>
</tr>
<tr>
<td>Power</td>
<td>Via USB or external power supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPLIANCES &amp; CERTIFICATIONS</th>
<th>AFS 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliances</td>
<td>ANSI/NIST/ITL-1-2000</td>
</tr>
<tr>
<td></td>
<td>ANSI/NIST/ITL-1-2007</td>
</tr>
<tr>
<td></td>
<td>ISO/IEC 19794-4</td>
</tr>
<tr>
<td></td>
<td>ISO/IEC 19784-1-2005 (BioApi 2.0)</td>
</tr>
<tr>
<td></td>
<td>NFIQ (NIST Finger Image Quality)</td>
</tr>
<tr>
<td>Certifications</td>
<td>FBI IAFIS IQS Appendix F</td>
</tr>
<tr>
<td></td>
<td>FBI v3.1 certified WSQ</td>
</tr>
<tr>
<td></td>
<td>CE</td>
</tr>
<tr>
<td></td>
<td>FCC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>AFS 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDK – Feature-rich SDK that includes:</td>
<td>auto capture image quality checks</td>
</tr>
<tr>
<td></td>
<td>automatic segmentation sequence check</td>
</tr>
<tr>
<td></td>
<td>Capture format WSQ, PNG, BMP, JPEG and JPEG2000</td>
</tr>
<tr>
<td>Operating Systems</td>
<td>32/64 bit Windows XP, Vista, 7, Server 2003 and 2008; 32/64 bit Linux</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MECHANICAL AND OTHER DATA</th>
<th>AFS 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>156 mm × 141 mm × 162 mm (6.14&quot; × 5.55&quot; × 6.38&quot;)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.0 kg (6.61 lbs)</td>
</tr>
<tr>
<td>Case</td>
<td>100 % protective metal case</td>
</tr>
<tr>
<td>Operating temperature, humidity</td>
<td>+5 °C to +40 °C (41-104 °F), 0-95 % (non-condensing)</td>
</tr>
<tr>
<td>Security</td>
<td>Kensington® security slot</td>
</tr>
</tbody>
</table>
ARH INC.

As an essentially innovation-driven company, the success of ARH lies in its strong focus on continuous research and development to create new technologies and in its ability to apply these achievements to meet continuously changing customer demands.

When you collaborate with ARH, your project is backed by two decades of expertise and hands-on experience in optical character recognition (OCR) and imaging technologies. The know-how of ARH is manifested in two main product lines:

- Automatic number plate / license plate recognition (ANPR/LPR) software and purpose-built cameras optimized for such applications

- Identity document readers and biometrics: advanced ID document scanners and fingerprint live scanner

The name ARH stands for Adaptive Recognition Hungary that reflects to the state-of-the-art OCR know-how of the company and its Hungarian origin.

ARH VALUES

- Dedication to customers’ success, understanding customer needs
- Innovation that matters – continuous in-house development
- Trust and personal responsibility – excellent pre- and after sales service

ARH’S FACTS & FIGURES

- Established in 1991 as a privately held corporation
- HQ: Budapest, Hungary (EU), Innovation Center: Perbal, Hungary (EU), USA office: Clearwater, FL
- Number of ANPR/LPR installations: over 50,000 worldwide
- Number of ID document scanner installations: over 30,000 worldwide
- In total, more than 2500 system integrators companies deployed ARH technology
- Five times awarded the “Technology Fast 50 Central Europe” prize by Deloitte

ABOUT ARH

COMMITTED TO INNOVATION
QUALITY AND CUSTOMER SERVICE
CERTIFICATIONS

ARH is committed to provide uncompromising quality in all of its products at all times. ARH is certified by three ISO standards, ensuring that the company’s operation conforms to the highest international standards.

ISO 9001:2008

Quality management system
that embraces the entire operation workflow: manufacturing, sales, marketing and customer support.

ISO 14001:2004

Environmental management system
that helps ARH to minimize the negative environmental effect of its operations. ARH is committed to be a green company.

ISO 27001:2005

Information security management system
that ensures the protection of confidentiality, integrity and availability of sensitive data at ARH.
CONTACT ARH

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PERBAL, 2074 HUNGARY