

RVF721 Vehicular Radar-Camera Integrated Unit



Introducing the RVF721, Nanoradar's first vehicular radar-camera fusion system, research and developed entirely in-house. Construction vehicles have large blind spots, collisions usually happen at turns and reversals. RVF721 puts a millimeter-wave radar and camera in one housing. The radar measures target distance, speed, and angle. The camera classifies objects and performs semantic segmentation. Both data streams are combined at the feature level. Antenna and algorithms are tuned for 40 m range. Real-time output includes target type, distance, speed, and angle, suitable for forward, reverse, and lateral warning and anti-collision function.



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Product Characteristics

Feature Level Fusion

- **Low False & Missed Alarms:** False alarm and missed detection rate $\leq 2\%$ for typical obstacles such as ground clutter, manhole covers, and overpasses.
- **High-Precision Range Measurement:** Radar-vision fusion significantly reduces depth estimation errors, achieving range accuracy of ± 0.1 m within the effective detection area.
- **Robust Detection:** Millimeter-wave radar provides precise distance and velocity data, while vision delivers powerful image interpretation. The complementary sensing enables stable detection even in complex environments.

All-Weather Perception

- **24/7 Reliable Operation:** Maintains stable performance in rain, snow, fog, haze, dust, and other harsh conditions, minimizing missed detections while reducing false alarms.
- **High protection level:** IP67-rated design with strong resistance to water, dust, vibration, and shock, ensuring reliable operation in extreme environments.
- **Smart Tuning:** Automatically adjusts sensor weighting based on environmental conditions—enhancing radar priority in rainy or foggy conditions and leveraging vision for clutter & interference filtering.

Integrated Design

- **Compact Form Factor:** Compact dimensions of $125 \times 75 \times 56.5$ mm, saving valuable installation space for system integration.
- **Cost Advantage:** Compared with LiDAR-based solutions, hardware costs are reduced by up to 60%, delivering precise 3D perception with outstanding cost efficiency.
- **All-in-One Sensor Design:** Integrates millimeter-wave radar, camera, LED, photosensitive sensor, and an intelligent fusion processor into a single compact device, simplifying deployment while delivering powerful perception performance.

Flexible and Easy Configuration

- **Quick Configuration:** Configure and debug the system through a mobile APP, enabling fast parameter tuning on smartphones or tablets.
- **Rich Interfaces:** Supports CAN, Ethernet, and 1080p AHD analog video output for easy system integration.
- **Low Maintenance Effort:** The integrated design ignores the installation angle deviations; minor shifts during vehicle operation do not require factory recalibration.

Built for Diverse Applications

- **Regulation Compliance:** Supports UN R151 Blind Spot Information System (BSIS), UN R158 Reversing Detection, and UN R159 Moving Off Information System (MOIS) for pedestrian and cyclist monitoring.
- **Multi-Scenario Deployment:** A single system can support vehicle safety assistance, spatial safety monitoring, and complex environment perception, eliminating the need for hardware replacement across applications.
- **Expandable Solution:** Algorithms and functions can be customized and upgraded to meet specific requirements across different deployment scenarios.



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Technical Specifications

Class	Description	Parameters
Overall	Size	125*101.5*56.5mm
	Weight	670g
	Overall Power Consumption	≤5W(Excluding fill lights)
Performance	Modulation Waveform	FMCW
	Refresh Rate	10Hz
	Detection Range	0.15-40m
	Range Accuracy	±0.1m
	Range Resolution	≤0.1m
	Speed Range	±60km/h
	Speed Accuracy	≤±0.12m/s
	Speed Resolution	≤0.25m/s
	Azimuth	120°
	Elevation	30°
	Maximum Targets	32
Power	Voltage	9~32V DC
	Current	≥1A
Environmental Resilience	Protection Rating	IP67
	Operation Temperature	-40°C~85°C
	Storage Temperature	-40°C~105°C

* In some countries or regions, millimeter-wave radar may not be able to turn on or can only be partially used. For details, please refer to local laws and regulations.



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Application Scenario

RVF721 vehicular radar-camera integrated unit supports autonomous driving with both forward and rear collision warning, which is ideal for robots, mining trucks, Sanitation Vehicles, buses, aerial work platforms, forklifts, loaders, and other vehicles requiring obstacle avoidance. It enhances vehicle safety, reduces driver's workload, and improves overall driving safety.



Robots



Sanitation Vehicles



Buses



MEWPs



Forklift



Loaders

