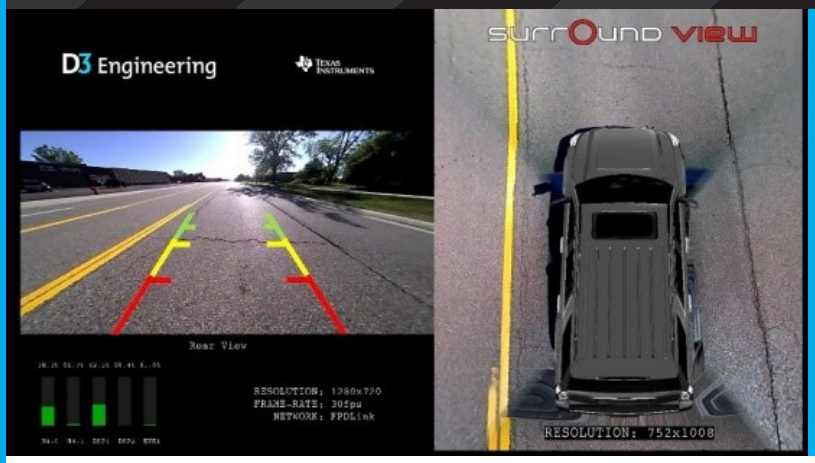
APPLICATION NOTE

DESIGNCORE® SURROUND VIEW



A 4-camera system that gives a 360° view; capable of stitching feeds together to generate a 3-dimensional, real-time rendering of the vehicle's surroundings.

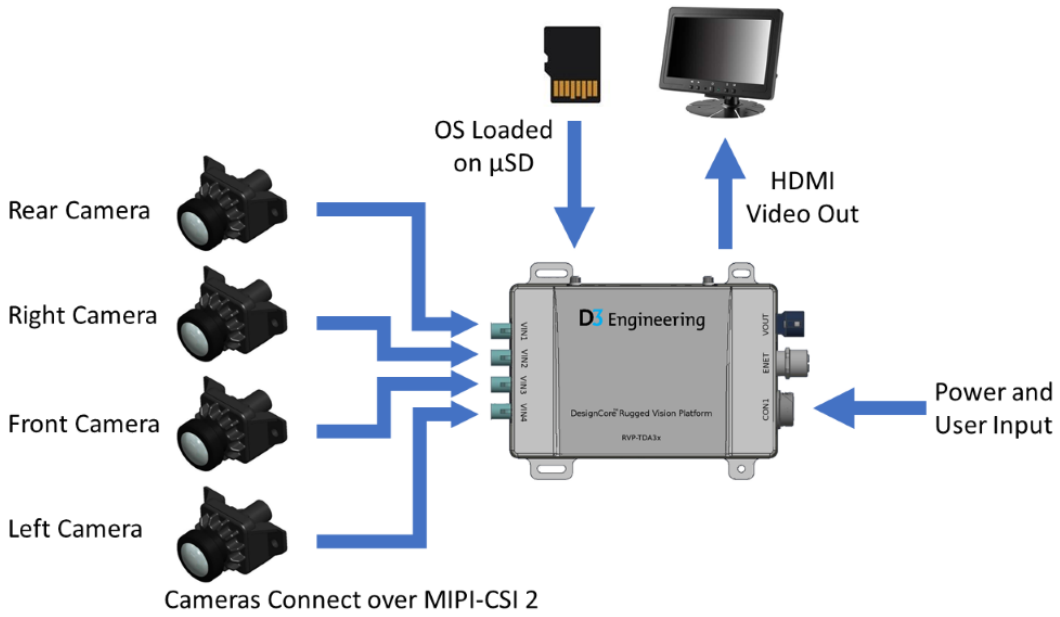
INTRODUCTION

Surround View uses 4 cameras; each with a 194° field of view. One is mounted on the front center of the vehicle, one is mounted on the rear center of the vehicle, and two are mounted on the side view mirrors (one camera on each side). These cameras feed to an RVP on the vehicle (typically a TDA3x RVP) where the video data from all cameras is stitched together and processed to create a 3D view of the vehicle's surroundings. This view includes a 3D model of the vehicle, which can accurately depict the body of the vehicle, as well as wheel movement, and any open doors. The perspective of the 3D view can be adjusted to a top-down view or a side view at an arbitrary angle. The rear camera can also be used as a backup camera, indicating the path of travel depending on the angle of the front wheels.

TECHNOLOGY

The cameras used for the Surround View system are one of D3's D3RCM (Rugged Camera Modules) that support FPD-Link™ III. They may be mounted to the vehicle using the mounting hardware included in the DesignCore® ADAS Platform. Typically, an RVP is used to process all camera data, display the rendered video on a monitor, and take user input to modify the viewing angle of the rendered video. The RVP can be powered directly from the vehicle's 12V bus. The OS (including Surround View software) is loaded onto the RVP using a micro-SD card. Video out over FPD-Link™ III is also possible with the 'VOUT' connector.

One-time calibration is required once the cameras are mounted. The tools and instructions to calibrate the system are provided with the purchase of a DesignCore® ADAS Platform.



COMPATIBILITY

D3 offers three product combinations that can each be used to construct this solution. Suggestions on how to construct this solution can be found in the **DesignCore® TDA3x Product Family Quick Start Guide**.

Below is our recommended product combination:
SKU 1001082 | DesignCore® RVP-TDA3x Development Kit, 2 GHz FPD-Link™ III
+
SKU 1000332 | DesignCore® D3RCM OV10640-913 Rugged Camera Module, 194° FoV
+
SKU 1000624 | 2GHz FPD-Link™ III Cable, 240 Inch
+
SKU 1000593 | DesignCore® ADAS Platform

Below is the second product combination:
SKU 1000730 | DesignCore® RVP-TDA3x Development Kit, 4 GHz FPD-Link™ III
+
SKU 1000581 | DesignCore® D3RCM OV10640-953 Rugged Camera Module, 194° FoV
+
SKU 1000567 | 4 GHz FPD-Link™ III Cable, 300 inch
+
SKU 1000593 | DesignCore® ADAS Platform

Below is the third product combination:
SKU 1000433 | DesignCore® RVP-TDA2x Development Kit
+
SKU 1000498 | DesignCore® D3RCM OV10640-OV490-913 Rugged Camera Module, 194° FoV
+
SKU 1000624 | 2 GHz FPD-Link™ III Cable, 240 inch
+
SKU 1000593 | DesignCore® ADAS Platform

SPECIFICATIONS

	Minimum	Nominal	Maximum	Units
SYSTEM INPUT CHARACTERISTICS				
Input Voltage	8	12	20	Volts DC
Input Voltage Protection		40	60[1]	Volts DC
Input Reverse Voltage Protection			–20	Volts DC
Input Current (no cameras)	0.22	0.34		Amps
Input Current (cameras)		0.60		Amps

1 Time limited, see component rating.

	TDA3x (2GB DDR3)		TDA2x or J6 (4GB DDR3)
PROCESSOR			
Memory	512MB NOR, 512KB FRAM	8GB eMMC, 512MB NOR, 512KB FRAM	
Camera Interface	4 x FPD Link III (CSI2)		8 x FPD Link III (Parallel)
Cameras	D3RCM line of Rugged Camera Modules. Other sensors integrated upon request.		
Connectivity	UART, CAN, ISO GPIO, Gbit Ethernet, uSD card, JTAG, QSPI, USB (J6/J6Eco), SATA (J6/J6Eco)		
Display	FPD Link III and HDMI		
Power	Automotive 12VDC		
Environment	Rugged enclosure with mount points Operating temperature –40C to 85C (105C option)		
Firmware	TI Vision SDK, TI Processor SDK, and D3 application framework		

For additional details please refer to the DesignCore® RVP-TDA3x, RVP-TDA2x, and D3RCM data sheets.

USE CASES

The Surround View system can be used for parking assist, monitoring/security, driver awareness, and as a reverse/rear view camera.

CONCLUSION

Surround View increases awareness, increases safety, is readily usable for parking and reverse assist, and can be used as the base platform for further video processing applications.

NEXT STEPS

Purchase a product combination at **D3Engineering.com/store** or email **sales@D3Engineering.com** to engage with our Design Services team.

Texas Instruments

D3 Engineering is a platinum partner in the TI Design Network and a Premier Ecosystem Partner for automotive systems development.

CONTACT US:
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