

## Overview

The surround view (digital) system (Sales Code is XAK) is available as an option on all chassis cabs and pickups. This system uses 5 digital cameras. This system provides three different views, surround, backup and cargo. The surround view system (XAK) is not available on pickups with box delete. (XBC) Field box removal on pickups with XAK is not recommended.

On pickup trucks, the system stitches the views from 4 of the 5 cameras together to provide a full 360-degree surround view. The 5<sup>th</sup> camera (located in the CHMSL) provides the cargo view. The system will use the camera at the rear of the vehicle to provide an FMVSS111 compliant backup view.

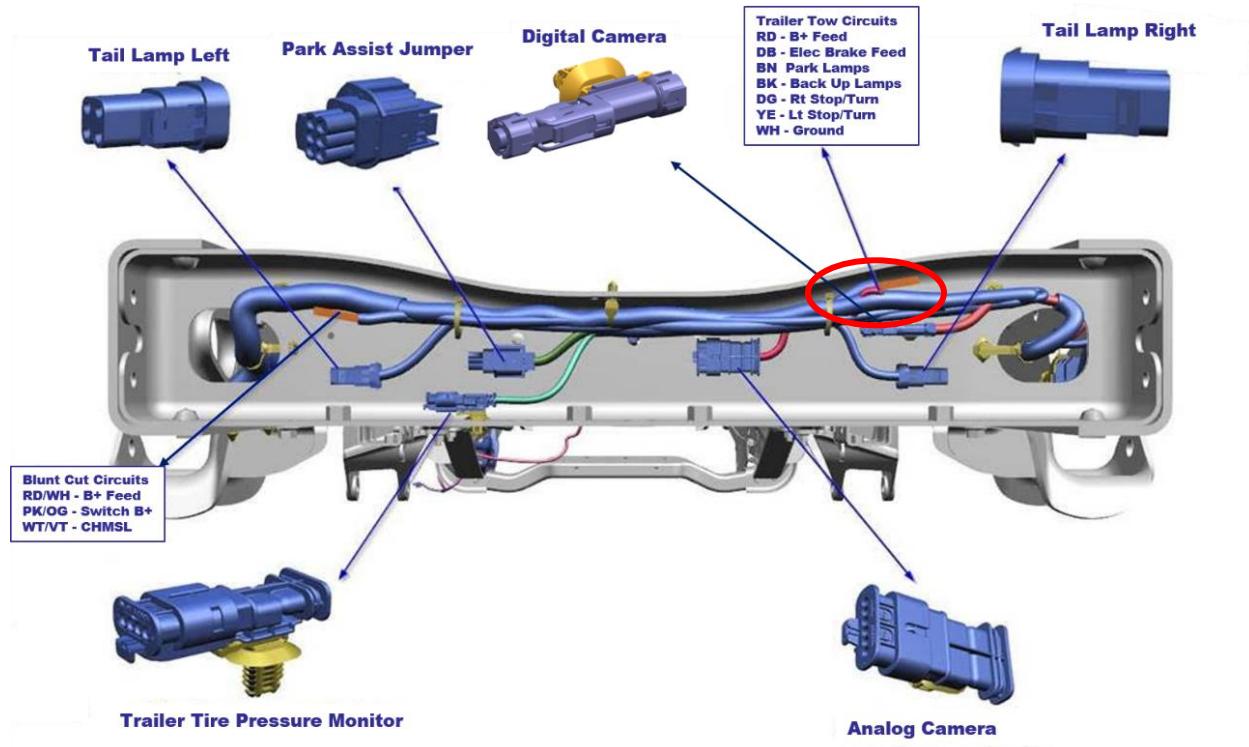
On chassis cabs, the system stitches the views from 3 of the 5 cameras together to provide a 270-degree surround view. The 5<sup>th</sup> camera (located in the CHMSL) provides the cargo view. The 4<sup>th</sup> camera and a 10-foot cable will come with a loose shipped. This camera will be installed at the rear of the vehicle by the upfitter to provide the backup view. If the chassis cab has a GVWR of 10,000 lbs. or less, (DF 3500) the final stage manufacturer will need to insure that the camera is mounted in a location that allows the vehicle to meet FMVSS111 requirements.

With this system, all views will be available in the screen in the center stack. On chassis cabs equipped with sales code XAK, the system will operate the surround and cargo views as delivered. The electronics will be configured to operate the backup camera view properly once the camera is connected. Prior to connection, the monitor will display a blue screen when the vehicle is in reverse. The table below outlines the radio and display options available on chassis cabs and pickups with surround view.

Sales Code	Radio System	Screen Size/Type	Nav/Connectivity	Camera Display
UAM	Uconnect® 4	8.4" Touch Screen	None	Center Stack Screen
UAV	Uconnect® 4C	8.4" Touch Screen	Nav and Cellular	Center Stack Screen
UAX	Uconnect® 12.0	12" Touch Screen	Nav and Cellular	Center Stack Screen

## DIGITAL CAMERA SYSTEM

There are a number of electrical/wiring features at the rear of the Ram chassis and box delete pickups. These features include the connector for the digital backup camera. The figure below shows the digital back up camera connection.



## DIGITAL CAMERA SYSTEM

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## Camera Connection

Chassis cabs equipped with surround view (XAK) will have a camera kit shipped in cab of the vehicle. The kit consists of a user mountable camera and an 8-foot cable. The kit P/N is 68395316AB.



**Camera Kit - P/N 68395316AB**

One end of the cable plugs into the camera, the other end plugs into the camera connector at the rear of the vehicle. The connector on the vehicle is a male coax connector located just to the right of center on the rear frame cross member. The connector is secured in such a manner that they may be hidden by the harness bundle and may be difficult to see. Depending on the up fit being installed it may be easier to make this connection prior to installation of the up fit. The connector will be capped from the factory. Remove the cap and plug in the cable from the kit. We recommend keeping the cap in case the need to remove the camera arises.

## Vehicles Built Without Factory Surround View

If the vehicle was not built with Surround View (XAK) it is not possible to add it. It may be possible to add the analog back up camera. (XAC) See document titled ANALOG CAMERA for details.

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## Pickups Without a Box

The digital surround view (XAK) system is not available on pickups with factory box delete. (XBC)

We do not recommend pick up box removal on vehicles with surround view. There is no way to convert the system to 270-degree view and surround view cannot be turned off. Mounting the rear camera at the exact same location may be difficult. Unless the camera is in the same location as it was when the box/tail gate was installed, the stitched surround view image will be distorted.

Box removal of a truck without surround view is possible. We recommend removing the camera and coax camera cable from the tail gate. Due to connector differences, the chassis cab loose ship kit P/N 68395316AB cannot be used. If you choose not to remove the camera and cable from the tail gate, the parts can be purchased through your dealer.

Mount the camera to the up-fit and use the cable to connect it to the vehicle. Please note that if the vehicle is a 2500, (DJ) it has a GVWR of 10,000 lbs and must meet FMVSS111. See the section below on FMVSS111. If the vehicle is a 3500, (D2) the GVWR is greater than 10,000 lbs. FMVSS111 is not a requirement.

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## FMVSS111

FMVSS111 requires a backup camera on all vehicles with a GVWR of 10,000 lbs. or less. Starting May 1<sup>st</sup> 2018, up fitters must insure that vehicles model year 2018 and newer and have a GVWR of 10,000 lbs. or less meet FMVSS111.

FMVSS111 has certain system function requirements as well as image size and field of view requirements. If you are up fitting a vehicle with a GVWR of 10,000 lbs. or less you will need to familiarize yourself with those requirements. The camera system as shipped will meet the system function requirements. However, field of view and image size are effected by camera location and aim. You will need to select a camera location and mounting that allows the system to meet these requirements.

The NTEA has developed a test method and provided educational resources to help members understand FMVSS111 and verify that the system meets image size and field of view requirements. We recommend that you use the NTEA method to determine an appropriate camera location and angles.



NTEA members can purchase the kit through the NTEA web site.

<http://www.ntea.com/StoreCategory?Cat=PUBSGUIDES>

See items titled FMVSS 111 FIELD OF VIEW (REARVIEW CAMERA) CONFORMITY MANUAL (# 2296) or FMVSS 111 FIELD OF VIEW CONFORMITY MANUAL AND KIT. (# 2297)

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## DIGITAL CAMERA SYSTEM

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## Camera Mounting

### General

Unless the up fit has been designed with a feature to mount the camera, a bracket or a mounting feature on the up fit will need to be developed. If practical, it is desirable to mount the camera in a location where the connector on the rear of the camera can be inside the up fit and shielded from the outside environment. If fabricating a bracket, it should be designed to offer as much protection to the camera and connector as possible. A mechanical layout of the camera is in **Appendix A**.

### Placement

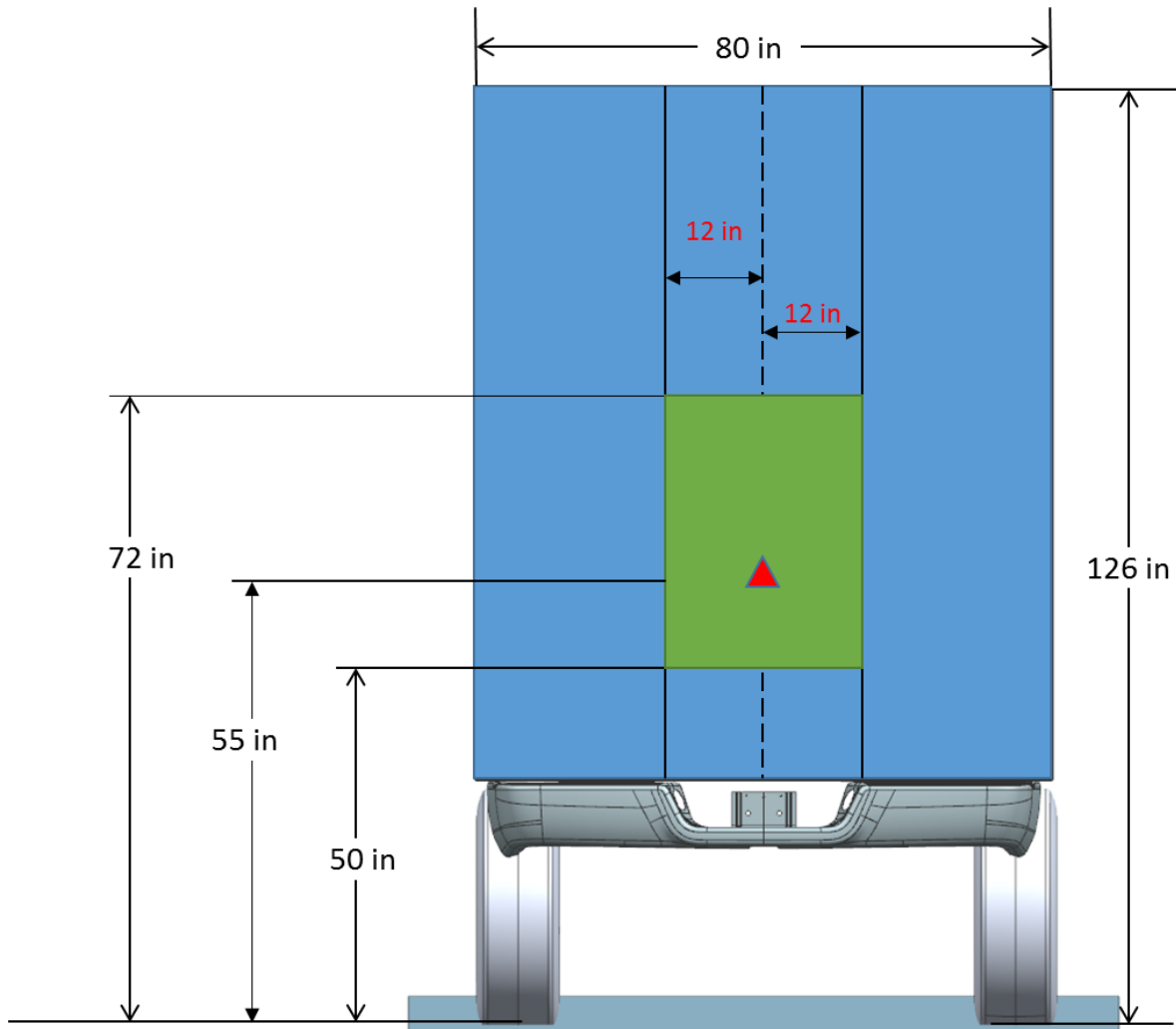
**ATTENTION:** *The camera placement zone shown below is intended to assist the upfitter in meeting the requirements of FMVSS111. Compliance to FMVSS111 will be the responsibility of the final stage manufacturer who certifies the vehicle.*

**NOTE:** This information is provided for directional purposes only, based on testing performed by FCA US LLC.

The recommended camera placement zone is defined in **Figure 1**. The diamond in the center of the green zone is the optimum placement location. Lateral dimensions are from the centerline of the vehicle and vertical dimensions are from the ground plain.

If the camera is mounted somewhere within the specified zone, the system is capable of meeting FMVSS111. Depending upon the up fit, it may be possible to meet FMVSS111 with the camera mounted in areas outside of the recommended zone. However, gaining compliance may be difficult and may require more development work.

**Figure 1**



**RECOMMENDED CAMERA MOUNTING LOCATION**

**DIGITAL CAMERA SYSTEM**

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## Aim

The camera should be mounted so the lateral (cross vehicle) centerline of the camera is parallel to the lateral (cross vehicle) centerline of the vehicle. In other words, the camera aimed straight rearward, not left or right.

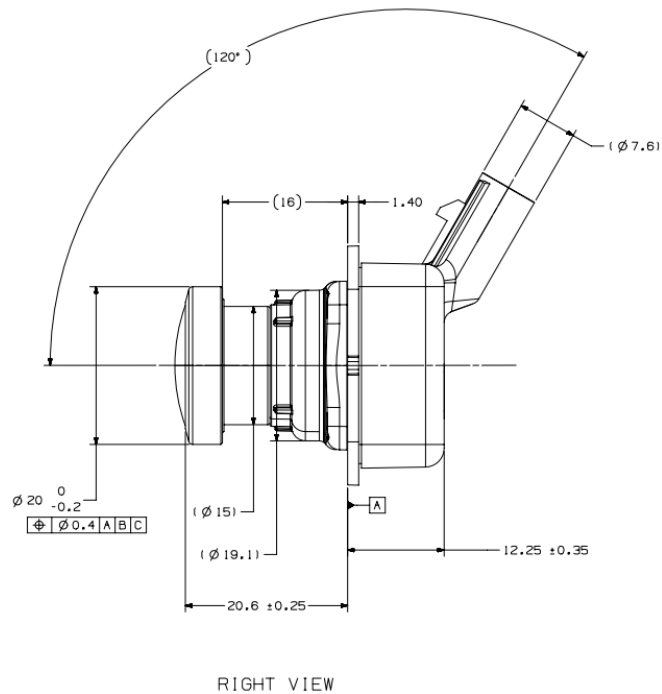
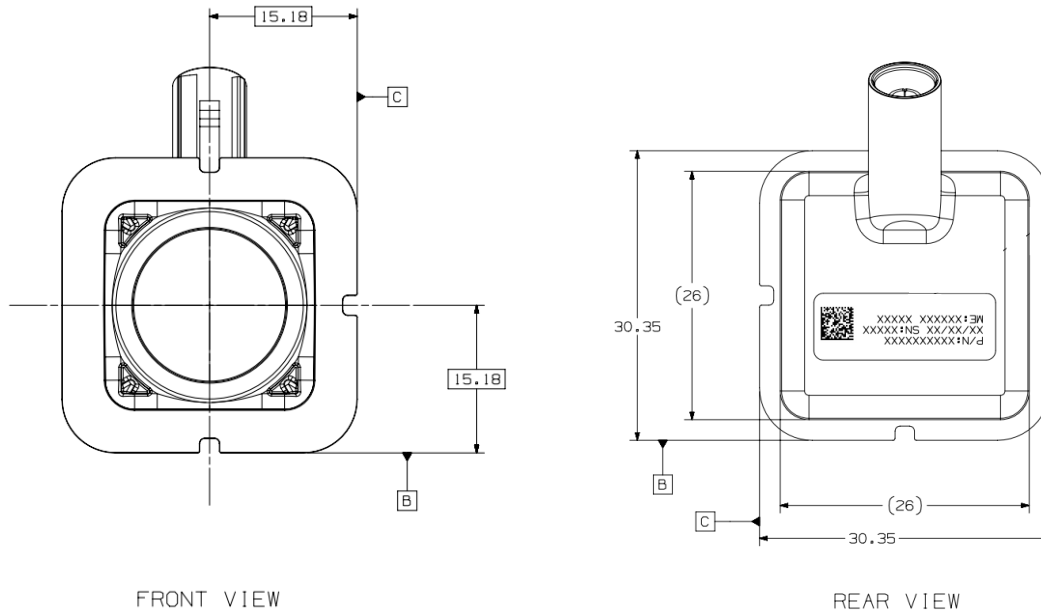
The vertical aim or “look down angle” will be selected to achieve FMVSS111 compliance.

## Look Down Angle Determination

The NTEA FMVSS111 field of view conformity manual and kit (NTEA # 2297) should be used to determine the appropriate look down angle to meet FMVSS111 field of view and image size requirements.

**ATTENTION:** When the vehicle is first placed in reverse, there will be a warning message at the top of the screen for the first 5 seconds. **THAT WARNING MESSAGE CANNOT INTERFERE WITH THE TEST OBJECTS.** If it does, you may need to adjust the look down angle upward slightly to compensate. Examples of images to demonstrating message interference are in **Appendix B** Please note these are SIMULATED images.

## Appendix A

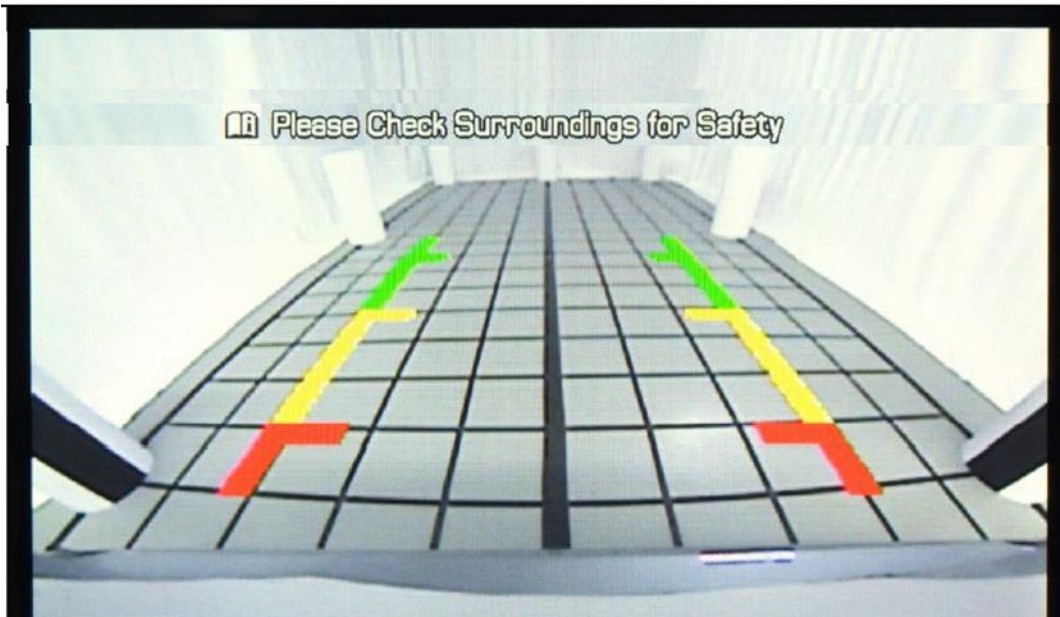


## DIGITAL CAMERA SYSTEM

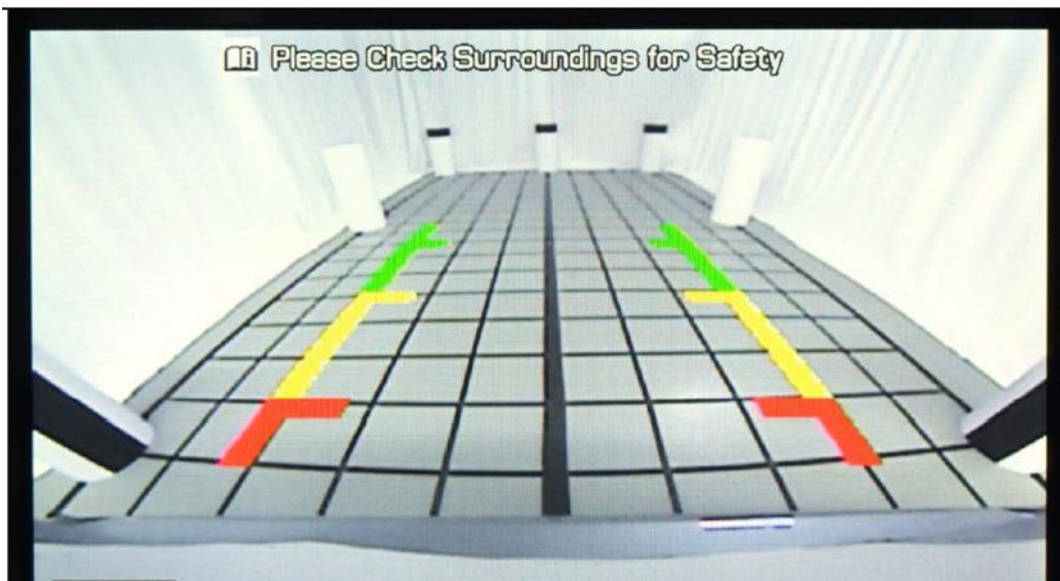
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## Appendix B

In the following image, the system does not meet FMVSS11 requirements with the warning message displayed. The message covers the top of the rear cones and the black stripes are obscured.



In the following image, the system does meet FMVSS11 requirements with the warning message displayed. The message is well above the top of the rear cones and the black stripes are completely visible.



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