

NAV-TV

INTERFACING THE FUTURE

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RAM MULTI-CAM

RAM uConnect (RA4/RA3) 5-Camera / AUX AV / CIM Interface

NTV-KIT586



BHM
12/10/15
NTV-DOC204

Overview

The RAM MULTI-CAM interfaces up to **5 cameras** & **1 Auxiliary A/V source** to the OEM RA4/RA3 8.4" uConnect media screen in 2013+ RAM vehicles. All connected cameras are displayed through data using factory controls. Turn signal camera activation is speed adjustable with programming from the factory radio controls/LCD cluster or NAV-TV USB Updater.

<i>Rear View Cam</i>	<i>Turn Signal Cams</i>	<i>Auto Front Cam</i>	<i>AUX A/V</i>	<i>Cargo Cam</i>	<i>Control in Motion</i>
					
RVC	Turn spd: 35	Front CAM	AUX Video	Cargo CAM: ON	CIM ON

Kit Contents



Plug & Play T-harness
NTV-HAR265



MULTI-CAM Module
NTV-ASY222



CAM Input
Harness
NTV-HAR267



USB Cable (updates)
NTV-CAB009

Optional Cameras available



Camera 12 (front/rear)
NTV-KIT564



Turn Signal-Cameras
NTV-KIT594



RAM-CAM
Rear camera
NTV-KIT426

Optional A/V switcher
(required for A/V input)



AVSW
NTV-KIT224

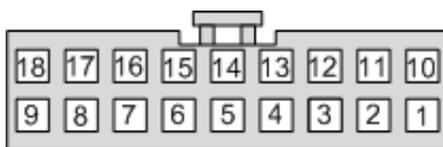


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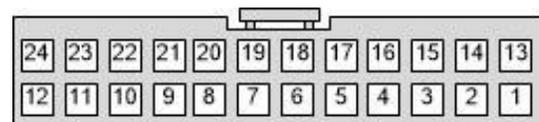
RAM MULTI-CAM Connectors	
18-PIN (Plug & Play T- Harness) connector	24-PIN (Cameras & I/O) Connector

PIN #	Description	Color
1	12v (+) Constant	Yellow
2	-Not Used-	Blue
3	-Not Used-	Orange
4	-Not Used-	--
5	-Not Used-	--
6	CAN (1) HI (<i>radio side</i>)	White/Black
7	CAN (0) HI (<i>vehicle side</i>)	Gray/Black
8	DIFF (+) (<i>radio side</i>)	Orange
9	DIFF (+) (<i>vehicle side</i>)	Blue
10	Ground (-)	Black
11	INPUT 2 (-) NOT USED	Blue
12	INPUT 1 (+) NOT USED	Gray
13	-Not Used-	--
14	-Not Used-	--
15	CAN (1) LO (<i>radio side</i>)	White
16	CAN (0) LO (<i>vehicle side</i>)	Gray
17	DIFF (-) (<i>radio side</i>)	Orange/White
18	DIFF (-) (<i>vehicle side</i>)	Blue/White

PIN #	Description	Color
1	Shield for Reverse-CAM RCA	Black
2	Shield for Front CAM RCA	Black
3	Shield for Right Turn RCA	Black
4	Shield for Left Turn RCA	Black
5	Shield for AUX VID RCA	Black
6	Shield for Cargo CAM RCA	Black
7	Ground OUT	
8	-Not Used-	White
9	-Not Used-	White/Black
10	INPUT 4 (NOT USED)	Purple
11	INPUT 3 Retrofit PDC Monitor	Pink
12	UART RX	Brown/Black
13	Signal for Reverse-CAM RCA	Yellow
14	Signal for Front CAM RCA	Yellow
15	Signal for Right Turn RCA	Yellow
16	Signal for Left Turn RCA	Yellow
17	Signal for AUX VID RCA	Yellow
18	Signal for Cargo CAM RCA	Yellow
19	-Not Used-	--
20	-Not Used-	--
21	OUTPUT 3 Retrofit PDC Power	Red
22	OUTPUT 2 AUX AVSW TRIGGER	Blue/Red
23	OUTPUT 1 12v ACC	Gray/Red
24	UART TX	Brown



Wire Side



Wire Side



18-PIN



24-PIN

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Dash Disassembly (RAM)

1. Remove the Torx t20 screw at the right rear of the pocket on the right side of the dash.



2. Remove (2x) Torx t20 at the top of the dash. They are hidden beneath a rubber mat.



3. The face should be free now, pull straight outwards (towards you) with medium force. Use plastic panel tools if necessary.



4. Remove (4x) 7mm screws that secure the LCD touchscreen.



RAM MULTI-CAM Module Installation

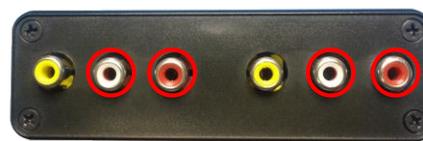
1. After removing the factory radio, grab the provided **Plug & Play T-harness** and connect the female side to the factory 44-pin plug. Make certain the lock connects together securely.
2. Install all cameras and run signal/power leads into the front dash opening.

Camera Installation Notes:

- a. 12v ACC is provided from **output 1** (PIN 23, gray/red). **If connecting multiple cameras, trigger a relay with this output instead to power your cameras!**
 - b. Connect each camera signal to each yellow RCA per their specific labels (rear, front, right TSC, left TSC etc).
 - c. The provided **Plug & Play T-Harness** contains red & black AUDIO RCA's in the center of the plug & play section. **If not adding any AV source for this install, connect these together (see diagram). If left disconnected, audio will not pass through.**
3. **Optional:** If installing *aftermarket front* sensors in addition to the MULTI-CAM, connect the following wires for sensor-activated front-cam switching:
 - a. Connect the sensor main unit's **power wire** to **output 3** (PIN 21, pink) from the MULTI-CAM
 - b. Splice the sensor main unit's **speaker signal lead (+)** to **input 3** (PIN 11, brown) from the MULTI-CAM
 4. **Optional:** If adding an additional A/V source (*AVSW required*), connect the following:
 - a. Connect **output 2** (PIN 22, blue) to the **white/red** wire from the **AVSW** (not included). Ground the **black wire** from the AVSW.
 - b. Connect the video signal from the AUX A/V unit to the RCA on the MULTI-CAM labeled **'AUX'** (video ports on the AVSW are NOT used)
 - c. Connect the audio signal from the AUX A/V unit to the **A1 input** of the **AVSW**. This may require the provided adapter.
 - d. Connect the **black & red RCAs** located in the **Plug & Play T-Harness** to the appropriate **red & white** ports on the **AVSW** (see diagram: pg. 9)



AVSW



Car side

Radio side

Installation continues on next page...

5. **Optional (UP TO 2015 RAMS ONLY):** If the vehicle possesses both **OEM** cameras (*reverse tailgate cam* on the rearview mirror and *cargo cam* on the main 8.4" screen), force both cameras to display on the main 8.4" screen by completing the following:

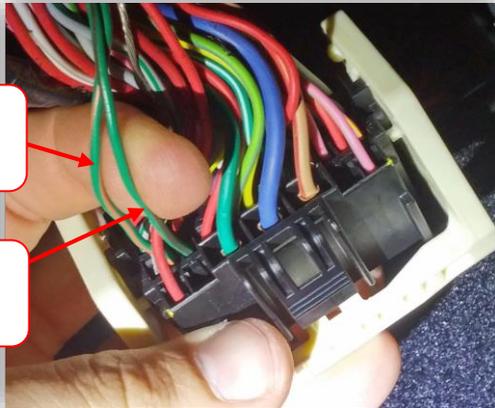
- a. **Extend** (splice, do not cut) the OEM tailgate signal with a **Single RCA cable (shield & signal)** to the main radio location. There are two easily accessible places for grabbing this RVC signal:

***Note: If the OEM tailgate RVC signal is cut in half, the rearview-mirror image will display an error while in reverse. SPLICE into these wires, DO NOT CUT!**

5.a.

Green/Orange:
RVC (-)

Green/Brown:
RVC (+)



Driver's side kick panel area

OR

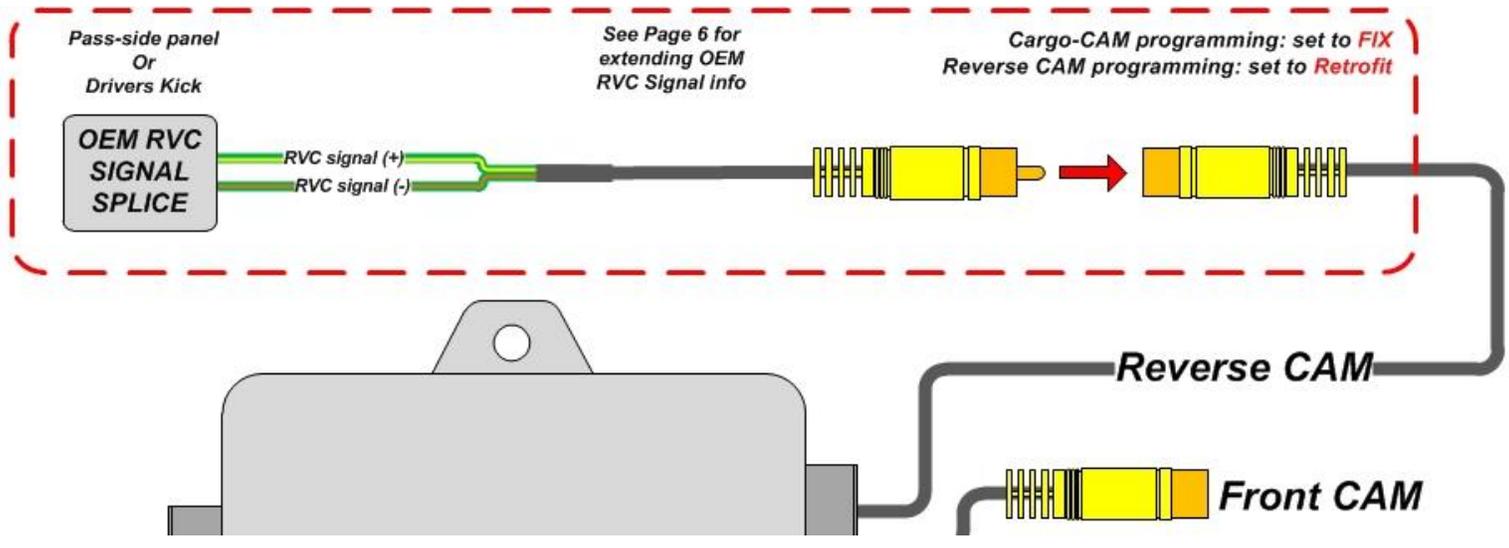
Green/Orange:
RVC (-)

Green/Brown:
RVC (+)



Passenger's side, behind side dash panel

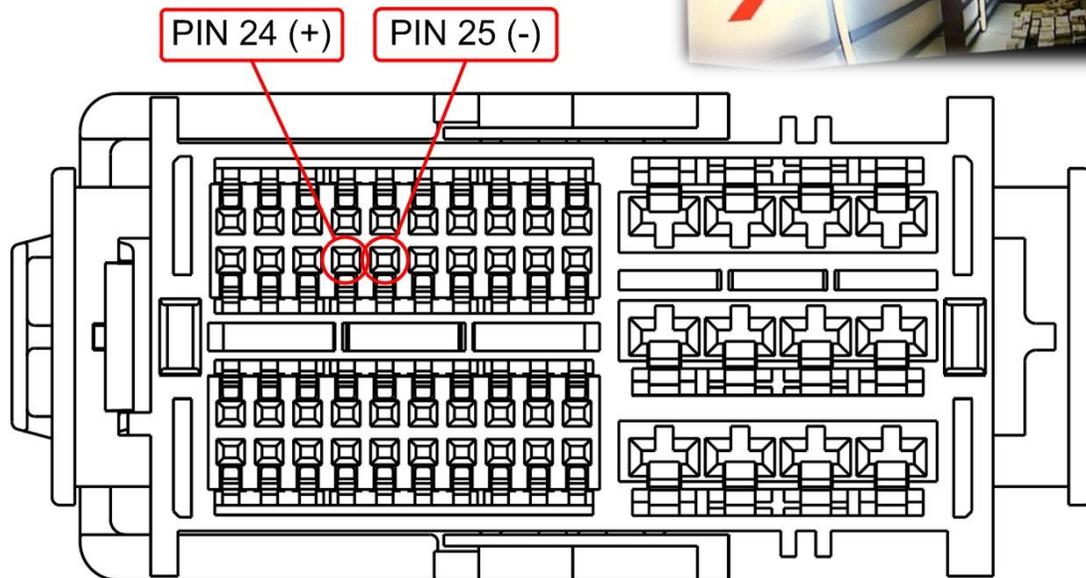
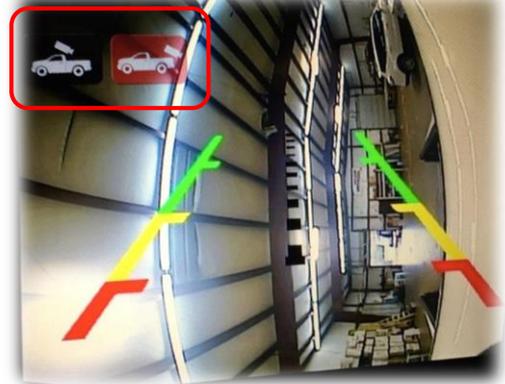
- b. Connect your **extended tailgate signal (RCA)** from step 5.a. to the RCA labeled 'Reverse CAM' on the 24-pin (RCA) side of the MULTI-CAM.
c. Make sure you set **Cargo Cam** to '**FIX**' in NAVTV Settings while programming the MULTI-CAM.
d. Make sure you set **RVC** to '**Retrofit**' in NAVTV Settings while programming the MULTI-CAM.



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6. Connect the RAM MULTI-CAM module to the 18-pin & 24-pin connectors found in the **Plug & Play T-Harness**.
7. Connect the male side of the Plug & Play to harness the monitor. Reconnect all other plugs to the monitor and proceed to **Programming** on **Page 10**.

8. **UPDATE: 2016 RAMs ONLY:** If you have icons when in reverse camera mode, for flipping between Cargo Camera and Tailgate Camera: splice a *female RCA* end into Pins 24 (+) and 25 (-) in the main radio harness to add an aftermarket Cargo Camera (this location is different than typical). See Diagram below for visual aid.



PIN SIDE view, Male Side

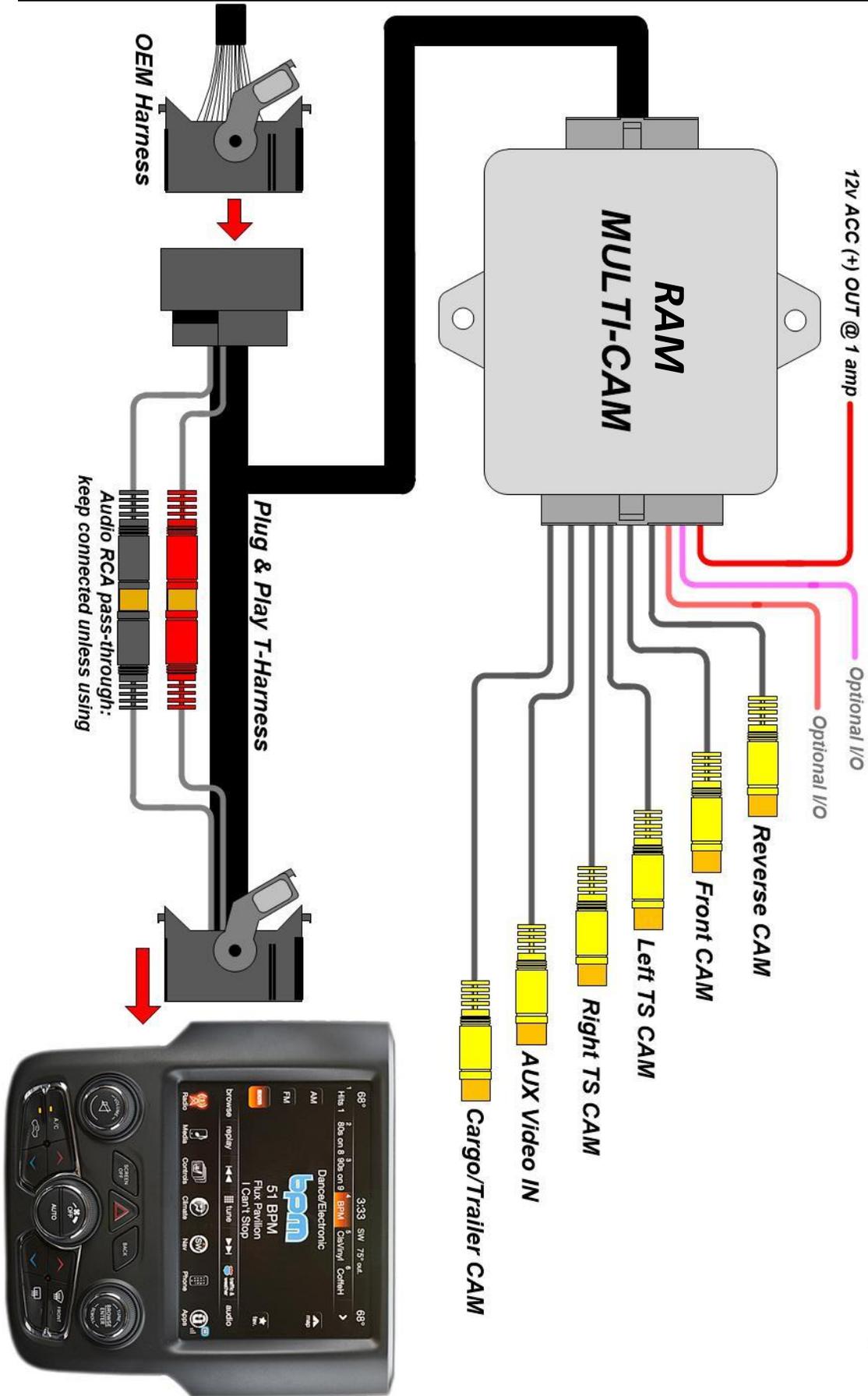
2016 RAM with icons on reverse screen only

****Provided Plug & Play Harness PINs are labeled inside the female end***

****KIT580 is still needed to emulate Cargo Camera access from main menu***

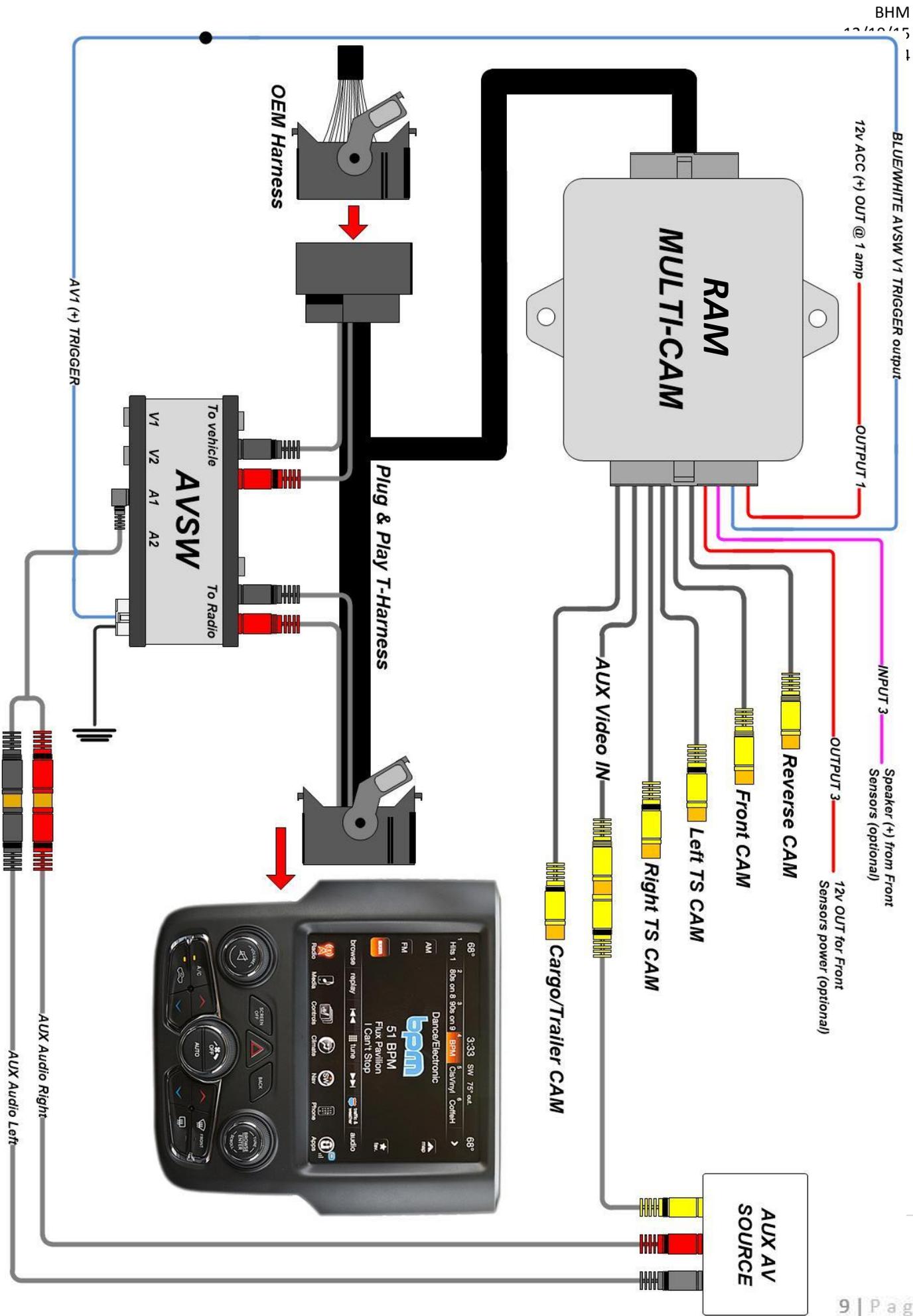
General Installation Diagrams

Cameras Only



held liable for
his product is

With AV AUX and Sensors



RAM MULTI-CAM Programming

There are 2 different ways to program the RAM MULTI-CAM:

1. In the vehicle, with through the factory dash MUTE button, TUNING KNOB, and CLUSTER LCD for feedback (true LCD cluster-equipped vehicles only), **or**
2. With a Windows PC, using the provided USB cable (any 13+ RAM with 8.4" equipped with any cluster).

This page (below) and page 11 outline programming using the OEM vehicle controls (while module is connected to the vehicle). *See page 12 for programming using a Windows PC.*



1. Before attempting to program, after making connections, let the vehicle perform a CAN-reset: Close all doors/trunk/hood, lock the vehicle and waiting 5 minutes before proceeding to program.
2. Turn the vehicle's ignition on. Be certain you're resting in **FM mode** (see an FM station frequency on the cluster), otherwise the cluster information may not display.



To show the FM source on the **cluster**, first clear any messages shown (door status, etc) with the UP or DOWN arrows on the steering wheel. Press the audio source button until 'FM' is displayed.



3. Close all doors (door status may override NAV-TV settings cluster feedback).
4. View the chart on the next page for settings descriptions and the diagram above to begin programming.
5. NAV-TV programming mode will time out (back to factory) after 15 seconds. *Scroll to the end of the settings menu and select 'EXIT' to exit and save settings.*

RAM MULTI-CAM Programming Parameters (OEM Cluster)

Programming sequence (cluster)	Selection option	Description
NAV-TV Settings	TUNE-Next Item / Enter Change	Rotate TUNE knob to access different menus, press knob inwards to enter/change setting
RVC	OEM / Retrofit	OEM: Vehicle possesses a manufacturer-installed reverse camera. Retrofit: Any aftermarket camera.
Force RVC	OFF / ON	ON: Enables option of forcing RVC.*
F. CAM	OFF / ON	ON: Enables option of installed front camera.
PDC	OFF / ON / OEM	OFF: Leave off if there are no sensors (OEM or aftermarket) ON: Set this option if adding <u>aftermarket</u> front sensors (for auto front-cam switching) OEM: Set this option if the vehicle has <u>OEM</u> front sensors (for auto front-cam switching)**
AUX VID	OFF / ON	ON: Enables option of AUX VIDEO
Cargo CAM	OEM / ON / FIX	OEM: No Change. ON: Emulates Cargo CAM menu. FIX: Displays both OEM cameras on main 8.4" display***
Turn CAM	OFF / ON	Activates Turn Signal Cameras
Turn Spd	ALL / 25 / 30 / 35	ALL: Turn Signal Cameras will display regardless of speed. 25: TSCs will only activate > 25 mph 30: TSCs will only activate > 30 mph 35: TSCs will only activate > 35 mph
Turn Rev	OFF / ON	OFF: Reverse-cam image will take precedence over TSCs ON: TSCs will take precedence over reverse-cam image
EXIT		Exits programming mode and saves changes.



*Factory Rear camera is controlled via LIN. Forced OEM RVC is not supported with the MULTI-CAM.

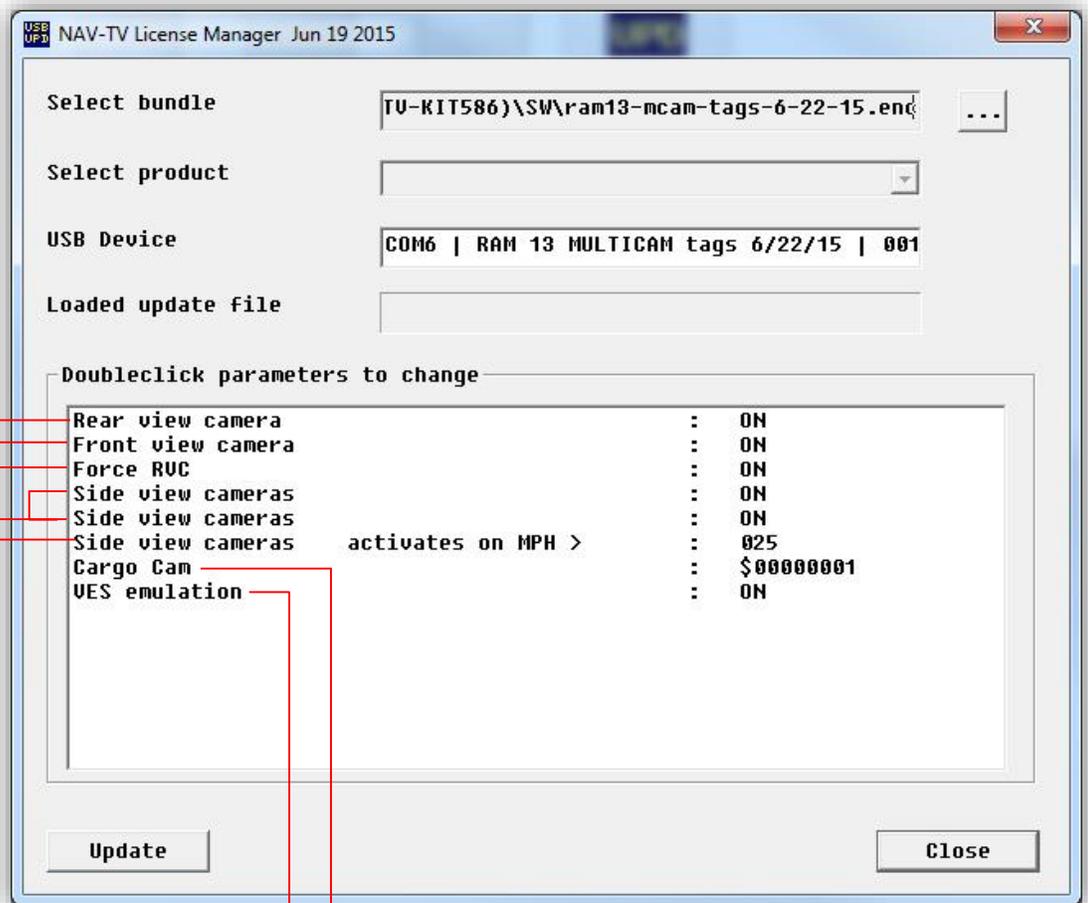
**OEM Sensor-switching not available with this release. This feature is coming soon.

***Requires extending the tailgate camera signal from passenger side dash or drivers kick to the main display. See page 6 step 5.

RAM MULTI-CAM Programming (USB Updater)

Programming the RAM MULTI-CAM with a Windows PC is the required method for vehicles equipped with a Dot Matrix gauge cluster instead of a true color LCD cluster.

USB Programming is performed using a Windows PC, and a NAV-TV specific MULTI-CAM updater. You can download the programmer and file from our website: www.navtv.com. Make sure the proper USB-UART driver is installed, and connect the interface to the PC with the provided USB cable.



Rear View Camera:

ON: Adding aftermarket camera
OFF: OEM rear camera-equipped

Front View Camera:

ON: Adding front camera
OFF: Not adding front camera

Force RVC:

ON: Enables option to force the Rear Camera (aftermarket only)

Side View Cameras:

ON: Enables side view cameras to display when a turn signal is pressed. *Both left/right activate together.*

Side View Cameras (MPH):

Activates on MPH >: Turn signal cameras only display from user-set speed and above. Double-click the value to change.

VES Emulation: ON: Enables option to add AUX Video source.

Cargo Cam:

OEM: No Change.

ON: Emulates Cargo CAM menu.

FIX: Displays both OEM cameras on main 8.4" display
Double-click for drop down menu.

NOTE: RAMs equipped with OEM Cargo Cam that are adding ANY additional cameras, MUST be set to **FIX**.

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RAM MULTI-CAM Operation

AUX: Press & hold (2 sec) to activate

Force front camera: Hold both 'SCREEN OFF' & 'BACK' (2 sec)

Force rear camera: Press & hold (2 sec)

CIM: Hold (3 sec) to activate (not supported for 2016s)



Rear Camera Operation: Placing the vehicle in to reverse will automatically display any connected camera. This image will take precedence over all other images **unless** the 'Turn Rev' feature is set to ON in NAVTV Settings (this setting makes Turn Signal Cameras overtake Reverse image).

Force Rear Camera: To force rear camera, press and hold radio 'BACK' button for 2 seconds. To exit forced rear camera, press and release radio 'BACK' button. **Note:** *forced rear camera is only supported on aftermarket cameras.*



Force Front Camera: To force front camera, press and hold both radio 'SCREEN OFF' & 'BACK' buttons together for 2 seconds. To exit forced front camera, press and release radio 'BACK' button.

Auto-Front PDC Camera: With 'PDC' enabled in NAVTV Settings (ON or OEM*), the connected front camera will display any time the following is true:

- The vehicle is in Drive
- The vehicle is traveling < 7mph
- The connected front parking sensors sense an obstacle

The radio will return to the factory image after the Parking Sensors no longer sense an intrusion, or the vehicle reaches about 7mph.

**OEM Sensor-switching not available with this release. This feature is coming soon.*



Activate Aux Video mode: To activate the AUX screen, press and hold radio 'SCREEN OFF' button for 2 seconds. To exit AUX mode, press and release the 'BACK' button.

- If using AUX video mode for an A/V source, the RCAs located on the Plug & Play T-Harness must be opened up with an AVSW (KIT224, not included with MULTI-CAM). See Page 5, Step 4.



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MULTI-CAM Operation *Continued*

Cargo CAM: When Cargo CAM is set to 'ON' or 'FIX' in the NAVTV Settings menu, the OEM Cargo Cam menu will be emulated on the radio. This will allow the option for forcing an added Cargo/Trailer/Baby camera (or displaying both on the main screen). Press the 'Cargo Camera' button located in the 'Controls' tab on the main radio screen to display the camera connected to the Cargo CAM RCA.

- If the user has and desires **both OEM cameras (Cargo CAM and Reverse CAM)** to display on the 8.4" screen, additional installation is needed, see Pg. 6, Step 5. The Cargo CAM option must be set to 'FIX' for this setup to work properly.
- After activated, while the vehicle is in motion, the **OEM Cargo Camera** will time out in about 5 seconds. For viewing the Cargo Camera for a longer duration (3 mins), activate the CIM function. See below.

If using this feature, you MUST perform a full CAN reset (after programming) before the menu will display!



2015 RAM Cargo Menu shown. For 2016 RAMs, the cargo icon should appear in the 'APPS' screen.

Turn Signal Cameras: To display TSCs, simply use the turn signals as you would normally and the connected image will display either all the time (while in drive), or only after 25, 30 or 35 mph respectively, depending on what was set in MULTI-CAM programming.

- If the user desires TSC images to take precedence over the reverse, this option must be enabled in NAVTV Settings (Turn Rev = ON).
- Additionally, the user may use a "bump method" to view the TSC quickly. Toggling the turn signal level quickly (just enough to engage the bulb) will display the TSC image for 3 seconds.



Activate CIM (Control in Motion): To activate CIM for factory navigation, press and hold the 'Volume' button for 3 seconds (CIM will disable automatically after 3 minutes). This function will also keep the Cargo Camera enabled for 3 minutes, and will reset upon every key cycle.

NOTE: Activating the CIM function will NOT bypass video in motion at this time, if equipped.



FAQs

Q1. I can't get into programming mode.

A1. Turn off the vehicle and remove the key. Close all points of entry and use the remote to lock the vehicle. Wait approx. 5 minutes without opening or disturbing the vehicle. Unlock and cycle the ignition to the 'RUN' position. **Make certain that the cluster is in FM radio mode before you begin programming;** and no errors are displayed (door open, etc), otherwise the cluster information might not display. Hold down the "MUTE" button until you see the display options post on the cluster.

Q2. When I try to force (front, rear) camera, nothing happens.

A2. Make certain you've enabled the options you want to use in the NAVTV settings mode and that you scrolled to the end *and selected 'EXIT' (or it will not save).*

Q3. I hear no audio when my auxiliary source is playing on screen.

A3. Verify that the audio RCAs are connected properly to the AVSW.

Q4. Everything works properly, but when an audio source is connected to the 3.5mm audio jack, there's no audio.

A4. Make sure the audio RCAs are connected together on the Plug & Play harness.

Q5. When I place the vehicle into reverse, I get a black or blue screen.

A5. Make sure the camera is getting sufficient power and the RCA is connected to the proper yellow RCA on the 24-pin harness.

Q6. The camera image is displayed properly when the vehicle is in reverse, but there's only a black or blue screen when the camera is forced.

A6. Make sure the camera power is not connected to the reverse lamps. Camera power needs to be connected to an accessory wire (cigarette lighter). If the camera is OEM, forcing it to display in any gear is *not* supported.

Other MULTI-CAM Notes:

- When multiple cameras are connected, the MULTI-CAM will clear back to the factory image **after 3 cameras have been forced in succession. This is normal.** I.E: If you had AUX mode displayed on screen, turned the left turn signal on (which will display), then rolled up to an obstacle which forced the front camera, placing the vehicle into park will then display the factory image (*will not return to AUX image automatically*).
- Cluster feedback only displays while programming (NAVTV Settings).
- Cargo Camera usage will only display for about 8 seconds when in motion, then will time out (this is a factory limitation). Activating the CIM feature will retain this image for 3 minutes if desired.
- When setting Cargo Cam to 'ON' or 'FIX', you must let the vehicle perform a full CAN reset, after programming, before the menu will display properly.

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