REQUIRED TOOLS AND HELPFUL LINKS

By: Tlusk7

This document will explain how to install the factory 360 camera system on your 14th Gen F150. This process is time consuming and takes knowledge of reading schematics and diagrams. I would like to give a massive thanks to @Jesse-Infotainment as I couldn't have done this without his help. In this document I will also list any tools that will be required and links to find parts etc.

INFORMATION PROVIDED BY @ZHENES – THANK YOU!

If you do not already have a 12 inch display, you will need to replace your APIM. This can be done with an 8 inch or a 12 inch display but the 8 inch display does not come with a digital APIM from factory. If you upgrade the display it is not plug and play, you will have to splice two pins in for power and add another harness. You also need a new climate control bezel. Check with Zhenes or Jesse-Infotainment for more information on this. I have provided the workshop manuals to remove the APIM, center speaker, and display on my google drive.

If you buy a new IPMA from ford it will have to be PMI.

APIM Part number **MU5T-14G670-PNN**

Harness part number **ML3Z-10E929-BLA**

12 inch display part number **ML3T-18B955-AF**

Harness part numbers for 12 inch display **ML3Z-14D20-2B , 6U2Z-14S411-JB**

Climate control bezel HERE

Tools Required other than basic hand tools:

Panel pry tools - Nylon Pry Bar Installer Kit, 4 Piece (harborfreight.com) & Trim And Molding Tool Set, 5 Piece (harborfreight.com)

Voltage meter (not required but could be needed for troubleshooting)

Terminal Removal set (Not required but I used it several times – you will be happy you got it - only needed if you are adding the CHMSL Cam) - https://a.co/d/co5Qnj8

Heat gun (or lighter if you must)

Crimpers and Flush Cuts (cut zip ties) - https://a.co/d/4oStarQ

Wire strippers that will go down to 22 guage wire - https://a.co/d/gcK14EX

Long fish rod / fiber glass rod - small diameter

Helpful Links:

https://drive.google.com/drive/folders/11euWezAGDvbDUOy3ULOqrcslmjehWs_O?usp=sharing – My google drive with all schematics, connector pin outs, harness overviews, and workshop manuals.

https://youtu.be/LZRHSQxGzBA - Link to video showing some of this install process.

Discount Ford Performance Parts, Lincoln Accessories | Levittown Ford (levittownfordparts.com) – Here you can order your mirrors, and your emblem that will hold the camera. I changed to black emblems since it was the same price to buy both as it was to buy just the front blue emblem.

Genuine Ford Parts Dealer Online | Levittown Ford Parts – Order all of your coax jumpers etc from the parts list here. Levittown is among the cheapest ford dealers I could find online. Shipping takes awhile as they have to special order these parts, but it is a legitimate ford dealer selling OEM parts.

Motorsport Wiring Super Store (prowireusa.com) – Here you can purchase high quality TXL wire used for the 3rd brake light / Cargo cam for very low prices as well as heat shrink and braided sleeving. This is pure copper stranded wire and is very high quality.

https://www.motorcraftservice.com/Home/SetCountry?returnUrl=%2F – Fords site to look at schematics, pinpoint tests, and lots of other helpful information. You should not need this as I have downloaded and provided everything you need. This does have pinpoint tests for troubleshooting in case you need it. It is $22 for a 3 day subscription.

https://a.co/d/7fYq9Yh – Non-insulated butt splices. **I DID NOT USE THESE I ALREADY HAD SOME AND USED THE ONES THAT CAME WITH THE FORD TERMINALS – I DO NOT KNOW THE QUALITY OF THESE.** Ford recommends you splice with these connectors and cover with heat shrink with adhesive inside. Stagger your splices to keep the harness small.

- I purchased my 3rd brake light from EBAY. I got it much cheaper than new. Search the part number on ebay before you order new.
- I purchased my IPMA from Jesse-Infotainment. Check with him before you order a new IPMA as it must be PMI and he will do that for you.

INSTALLING THE FORD FACTORY 360 CAMERA SYSTEM

Front Camera Installation

For the front camera you will be using part numbers listed:

FRONT CAMERA - **ML3Z-19G490-C** (REPLACES ML34-19G490-BB, ML3T-14G490-BC)

FRONT CAM HOUSING(PLASTIC) - **ML3Z-19H511-A**

HARDWARE - **W506962S450**

*FRONT CAM JUMPER - **ML3Z-10E929-CCA** (FRONT CAM IS PREWIRED TO THE GRILL. THIS JUMPER IS FROM THE GRILLE TO THE UNDERHOOD CONNECTOR C1591) $10 – **THIS WOULD ONLY BE NEEDED IF FOR SOME REASON YOU DO NOT HAVE THE PRE INSTALLED JUMPER FROM THE HOOD LATCH TO C1591***

*C1591 TO C316 – **ML3Z-10E929-CBA** (THIS JUMPER GOES BETWEEN THE TWO UNDER HOOD DRIVER SIDE CONNECTORS. **THIS WOULD ONLY BE NEEDED IF FOR SOME REASON YOU DO NOT HAVE THE PRE INSTALLED JUMPER BETWEEN THE TWO CONNECTORS.***

SHORT FRONT CAM JUMPER - **ML3Z-10E929-CDB** (THIS IS THE JUMPER FROM THE FRONT CAM TO THE PRE INSTALLED HARNESS BEHIND THE GRILLE)

FORD BLUE LOGO FRONT CAM - BLACK PLASTIC - **ML3Z-8213-F** W/WASHER NOZZLE HOLE(DOUBLE CHECK) $135
OR BLACK FRONT EMBLEM WITH CAMERA SLOT & WASHER HOLE AND REAR BLACK EMBLEM BOTH **M-1447-FBC1**

WASHER HOSE FOR FRONT CAM - **ML3Z-17A605-B**

WASHER HOSE FOR FRONT CAM 2 - **ML3Z-17A605-C**

WASHER NOZZEL FOR FRONT CAM - **HC3Z-17603-B**

NOZZEL CAP - **ML3Z-17C526-A** (BLACK PLASTIC)

To install the front cam, you will need to remove the original front emblem first. There are 3 nuts on the back plastic tabs holding it onto the grille. These nuts cut into the plastic and make their own threads. Depending on the grille you may need to remove it to access the back of the emblem. If you have skinny arms and a lariat grille with large openings like mine, you may be able to stick your arm through and remove it without removing the grille. My google drive has the workshop procedures to remove the grille and to remove / assemble the camera and washer nozzle. The grille removal procedure is linked here. The camera procedure is here.

Once you have the front emblem off and the new emblem assembled with camera and washer nozzle, it's time to run your coax and washer hose. The short washer hose ending in "**C**" and the short coax jumper ending in "**CDB**" will plug onto the back of the front emblem camera and washer nozzle.

The coax will plug into the pre-installed jumper located under the rubber cover on top of the radiator, right in front of the hood latch. This jumper has a dummy plug located inside of the boot and will need removed. This pre-installed jumper runs back to **C1591** then goes through the short pre-installed jumper ending in "**CBA**" and into **C316**. C316 is where you will connect pin 1 from the IPMA.

The washer hose ending in "**C**" will connect to the hose ending in "**B**". Washer hose "**B**" runs back to the passenger side corner of the engine bay close to the battery fuse box. There is a connection point where the washer hose comes together, disconnect the hose at this point and install the washer hose T connector that comes on part number ending in "**B**". You can run this hose how you like, I ran it between the battery and the fender and then through one of the holes by the washer fluid tank and up along the radiator core support to the hood latch. There are some hook like tabs along the harness here, I put my washer hose in them to hold it up. The hose then goes up through the gap by the hood latch and gets secured right beside the coax connection boot, there is a slot made for it, and connects to the short washer hose piece ending in "**C**".

Mirror Cam Coax Installation

Part Number: SIDE CAM COAX – **ML3Z-10E929-DBA** (JUMPER FROM MIRROR TO DOOR CONNECTOR)

This procedure is the same for both doors, to pull the door panel off please see the workshop manual here. Pulling the door panels is simple just take your time. For the handle cable, there is a small lever on the cable end that will release it from the door. I show this in my video.

To release the door connectors, there are clips at the top and bottom that need to be released. Looking at the rubber cover you will see an indentation on the top and bottom. Take a large flat head screwdriver and push on these tabs and pry out away from the truck at the same time. This does take a bit of force to get them out. Once the connectors are out you will want to pull the boot out of the door and get the entire rubber tube as straight as possible. You will also need to pull the rubber cover from the back of the door connectors. I was able to fish the coax through the boot with a small diameter fiberglass fish rod. I slit the boot on the door to get the coax through and did the same on the boot that goes from the door to the truck. To insert the coax into the gray door connector, pull and release the white lock inside of the connector then insert your coax. When reinstalling the door connectors into the truck body, it takes a good bit of force to lock them back in place. Push them in till you hear them click into place.

IPMA Module and Coax Installation

Part Numbers:

GREEN COAX ASSEMBLY - **ML3Z-10E929-CAA** (FOR SIDE CAMS AND FRONT)

TERMINAL – **DU2Z-14474-CA** x4 (IPMA CONNECTOR TERMINAL PINS)

The IPMA is located in the driver's side kick panel above the hood release latch. See fords removal procedure here. You will have to remove the trailer module to remove the IPMA. The trailer module has two bolts and a plastic push clip on the bracket, you can remove that if you like. The easier route is to push the plastic tab on the side of the trailer module and slide the module down off the bracket. You can still get to the two bolts on top of the IPMA with tools with the trailer module bracket still installed. The IPMA has two clips that hold it in at the top once the two bolts are removed, you should be able to pull firmly and pop the IPMA loose from these clips. Once free lift upward and remove all connectors. Install in reverse order.

To install the coax connector **CAA**, you will be running coax pin 1 to the underhood connector .**C316** pin #64.

EDIT: Revised 3/19/24 – A lot of people seem to struggle with C316. This may be the hardest part of the job. There are a few tricks I show in my video, but I have figured out how to take this connector apart properly without breaking it. In order to pull the black backing piece off, release the grey clips on the side and insert a small or cut zip tie under the tabs to keep them from locking back into place. Example of that here. Take needle nose pliers and grip the back of the black cover from one of the open pin holes, wiggle back and forth width ways to edge both sides off. Be slow or you can break the inner plastic where you are grabbing. After this cover is off, remove the green rubber (or white plastic) pug from pin #64. If you have a white plug you may not need to take the connector apart, only release the blue pin locking cover with needle nose pliers and a gentle pull. This is all I had to do on my 2023 and I could insert the coax. If you have a green rubber plug in this connector you will likely have to remove the inside blue and red pieces. See my attached diagram for pictures and how to do that. There are clips holding these in, do not rip them out with pliers or they will break. Be patient and it Is very easy to take them apart. The blue has two clips that can be reached with am angled pick while pulling with needle nose gently, and the red has 4 clips that can be released easily while pulling with needle nose gently. Once these are out insert your coax and reassemble. *\ End Edit.*

For **CAA** pin 2 you will need to remove pin #2 from the brown IPMA connector **C242F** and insert it into the green connector **CAA** pin #2. To get these connectors apart, first lift up on the purple locking clip with a very small flathead screwdriver. If you are looking at the back of the connector where the coax comes out, you should see a small gap in this purple lock just between the two green clips. Be gentle as this purple lock is easy to damage. Once you have it released, you need to remove it completely. I found the easiest way was to pry from the sides to remove it completely. After removing the purple lock, you will need to gently lift on the green clip holding the coax in while pulling on the coax at the same time. The coax will release once the green clip is lifted; it doesn't have to be lifted much.

CAA pin #3 goes to left door connector and pin #4 goes to right door connector. For the right door connector, I ran the long coax up behind the dash, I followed a harness that goes through the brake pedal bracket, then dropped behind the dash and followed the air duct. The jumper is going to have extra length if you do it this way because it is intended to run under the console. **DO NOT FOLD THE EXCESS COAX UP.** This is coax, you want to coil it up nicely and zip tie it out of the way. When inserting the coax into the door connectors you will release the white lock on the connector face and insert the coax. You should hear it click into place.

To wire up the third brake light you will need to build a harness containing 5 22awg conductors. I chose to order quality wire and build a harness using braided sleeving. Instead of buying tools to crimp terminal pins onto these wires, I ordered the terminals from ford and spliced them on using non insulated crimp terminals and adhesive heat shrink. You could also buy a 5-conductor cable from amazon and run it. This is all preference. Refer to the schematic here to better understand this harness. You will be adding one wire to connector **C242B** pin #1, and 3 wires to **C242C** pin #10, #19, & #20. The cargo cam also needs a power feed that is supposed to come from connector **C265** – this connector is above the passenger side footwell behind the dash.

~~*It would be very hard to access, and the other side of the needed power feed may not even be there. Jesse mentioned he had success with using connector* ***C242A*** *pin #1 on the IPMA for power. I tapped off of this wire as well and have not had any issues. There is a plastic pin holding the IPMA harness at the top of the plastic bracket that holds the IPMA, if you pull that plastic pin out it should allow you to drop the connectors and harness down a bit more to splice into pin #1 on connector* ***C242A.*** *This is an 18awg wire if it is white, or a 16awg wire if it is Yellow-Orange.*~~

EDIT: Revised 3/19/24 – C265 is very easy to access and pin out. I have verified that it is wired to the battery fuse box under the hood (Fuse 25 – 10 Amp) and used this pin on another install I did. First remove the 4x4 module bolted to the passenger side floor below C265 and the ambient lighting / trim piece below the glovebox. Next you are going to put the pin TERMINAL#: DU2Z-14474-BA into pin #5 of this connector. I chose to make a harness with one single white wire and run it all the way down the passenger side, up the C pillar and into the third brake light. The passenger side C pillar is pretty busy, another option would be to run the single wire over to the IPMA and then continue down the driver side with the other 4 wires. I do not feel like this was any harder than splicing into the IPMA power, and this prevents you from having to cut any harnesses. If you would like, I have an example here. *\ End Edit.*

Once you have these wires pinned out correctly at the IPMA, you can plug everything back in and install your new IPMA.

Cargo Cam Harness Installation

Part Numbers: TERMINAL - **EU2Z-14421-CA** x5 (HIGH MOUNT BRAKE LIGHT CONNECTOR C904)

For the cargo camera you will be pulling the harness you built from the IPMA to the 3rd brake light. You will be inserting pins into connector **C904** pin #3, #4, #5, #6, & #9. The schematic will show pin #5 as the video shield, just run a wire for this.

IPMA & APIM As – Built Changes

CHANGES TO **APIM**

7D0-01-01	**XXXX**	**XXXX**	**BDC1**

7D0-01-02	**A300**	**XXXX**	**XXXX**

7D0-01-04	**XXXX**	**FC20**	**XXXX**

CHANGES TO **IPMA**

706-02-01	**736B**	**FFCC**	**41FA**

706-02-02	**E05F**	**CE00**	**001E**

706-03-01	**4000**	**0500**	**0056**

EDIT: Revised 3/19/24
If Front Park Aid Equipped (2021-2022)

706-01-01	**XXXX**	**AXXX**	**XXXX**

706-12-01	**XXXX**	**X4XX**	**XXXX**

706-16-01	**XXXB**	**XXXX**	**XXXX**

*If Front Park Aid Equipped (2023 – SAME AS ABOVE EXCEPT **706-12-01**)*

706-12-01	**XXXX**	**X8XX**	**XXXX**

\ End Edit

Troubleshooting

If you have any cameras giving blue output, check all of your connections, check for bent coax pins or damaged coax ends. A good way to test each camera is to plug it into the rear cam port of the IPMA (Pin #2) and see if it gives you output. Just because a camera is giving output does not mean it is operating correctly. If the only camera that is working is the rear camera, and the side cams and front are all 3 blue then it is possible you have a bad camera somewhere. The fastest way to test this is to unplug the cameras one at a time with the truck on, and camera view displayed on the screen. If you unplug a camera and then plug it back in and the other cams display image, something is most likely wrong with that camera.

APIM And Center Display Replacement I myself have not done this, but if you currently have an 8 inch display in your truck you must upgrade the APIM as the one that comes with the 8 inch

display does not have a digital camera input. The part numbers for the APIM and harness are listed above. The harness will go from the IPMA to the APIM. Connector is C242F. Pin 1 of this connector will be the video out that plugs into the APIM. Pin 2 of this brown connector will be empty, it normally holds the rear cam but as you should have read earlier in this document, it moves to the green IPMA connector C242E. Pin 3 goes to the camera in the top center of the windshield if equipped. You will also need to add 2 harnesses if you upgrade to a 12 inch display. You will need to take the connector harness you ordered part number **6U2Z-14S411-JB** connector number C2254B and splice Pin 1 to C2342 Pin 1. Pin 4 on C2254B will splice to Pin 37 on C2342. Both of these connector pin outs are on my google drive. Then you will add the harness **ML3Z-14D20-2B** from the APIM to the new 12 inch display. You will also need a new bezel for the climate controls and you can find that HERE.

Calibration

After everything is installed, and you have verified you have video from all 4 cameras and the cargo cam, you are ready to calibrate. **YOU CANNOT CALIBRATE THE 360 CAMERAS IF ANY OF THE 4 360 CAMERAS ARE BLUE.**

There are three calibrations to be done. You will need to calibrate the lane keep assist, the 360 cameras, and the cargo cam if you added it.

EDIT: Revised 3/19/24 To calibrate the cargo cam, open Forscan and connect to the vehicle. Navigate to the "Service Procedures" tab with the wrench icon. Scroll to the bottom and find IPMA – Local Interconnect Network New Module Calibration. Run this and you will see (DTC B152E – Rear Cam 2) set in the IPMA clear and the cargo cam will have the white line going up the center when viewing. *\ End Edit.*

To calibrate the lane keep assist, open Forscan and connect to the vehicle. Navigate to the "Service Procedures" tab with the wrench icon. Scroll to the bottom and find IPMA – Lane Departure Warning Syst em Camera Calibration. Read all the information and follow it. I did this by driving on the interstate. It calibrates quickly, and you do need to sit in drive at a dead stop for about a minute when you first start the procedure so keep that in mind. Once you have ran this calibration a lot of your warnings on the gauge cluster should go away and your lane assist should work again.

To calibrate the 360 cameras, open Forscan and connect to the vehicle. Navigate to the "Service Procedures" tab with the wrench icon. Scroll to the bottom and find IPMA – 360 View Camera Calibration. For this procedure you need to find a very large parking lot with clearly marked lines. Keep in mind you can only calibrate this once successfully, then you cannot redo it without FDRS and a mongoose cable. Run the procedure and follow the steps. You will see your 360 cam display go away when you begin the procedure, press the button immediately after it disappears or it may mess this procedure up. Once the display comes back it should be a black screen with a gauge icon and a steering wheel icon. You cannot exceed 5mph or it will cancel the calibration. You want to drive as straight as possible. You can drive in between the parking spot lines or you can drive down the row. If you are driving between the lines, try and stay as

centered as possible. If you are driving down the row, make sure you are close enough that your camera is seeing the lines on that side. After the calibration is done, the radio display will reach 100%. You can then stop and remain in drive and wait for Forscan to complete. Once completed make sure your B1578 DTC has cleared. You should not see any DTCs in the IPMA at this time.