

# Kenwood Touch Screen Integration

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## Introduction

This technical brief will discuss the steps and parts needed to convert and feed a Computer VGA or RGBHV signal in to the RGBS Nav input of late model Kenwood Multi Media Head Units and video displays with a Nav input. It will also discuss the steps needed to interface with the touch panel of Kenwood displays that are equipped with them. This brief will not discuss integration of specific signal converter hardware or specific touch panel controllers or specific Kenwood models it will only be a general guide to connecting such hardware together.

## Warning

If you are not experienced working with electronics or SMD electronics stop and find someone that is experienced this project requires an expert technician.

This brief applies to all Kenwood Multi Media Head Units model year 2003 to the date of this brief and all Kenwood video displays with a 13 pin din RGB Nav input manufactured up to the date of this brief.

This brief does not apply to any Kenwood Multi Media Head Units model year 2002 or older or any Kenwood video displays that do not have a 13 pin din RGB Nav input.

Do not attempt this mod on a **Kenwood** eXcelon **LZ-800W** display this model has a bug that makes the RGB signal blurrier than a composite signal

## What You Need To Know

All testing was done on a Kenwood DDX 7015 this document assumes that you are experienced with the types of hardware mentioned in this document you must do your own research to determine that this information applies to your display as it may be very different.

### Parts needed

- 1 Kenwood Nav cable
- 1 VGA RGBHV to RGBS Scan converter
- 1 case for touch interface
- 1 USB 4 Wire resistive touch controller
- 1 4PDT relay with a 12v coil (2 relays if keeping Kenwood Nav Unit)
- 1 1 amp rectifier diode (2 if keeping Kenwood Nav Unit)
- 1 Latching switch (on - off)

Appropriate wire and connectors you must decide what size will work best for your application

Solder

Shrink wrap

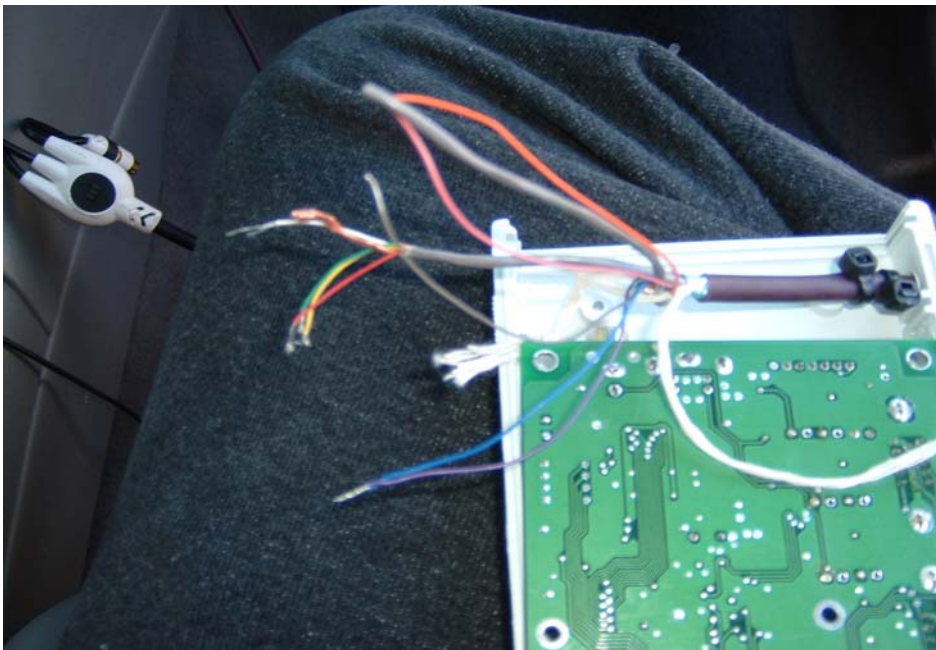
### Tools needed

- 15 watt Soldering iron with 1mm micro tip made for SMD
- SMD tweezers
- Magnifying glass
- Wire strippers
- Misc. screwdrivers and pliers
- What ever else you think you need to work on your hardware

## A bit of video knowledge to help you understand what you are doing

The Kenwood RGB Nav input is a RGBS input meaning it only has one sync input your everyday VGA card is a RGBHV meaning it has a separate vertical and horizontal sync output. The frequencies of the two sync signals are also very different form one another because of this you need to use a Scan converter to send a VGA signal to it.

Take a look at the photo below



In this photo you can see the cut open Nav cable inside you will find 2 gray shielded cables the smaller one has a red, white, and a shield wire this cable is the Nav audio input red is right +, white is left + and audio signal ground is the shield wire.

The bigger gray cable is the RGB video input inside you will find the following wires

Red = Red Signal  
Yellow = Green Signal  
White = Blue Signal  
Green = Sync Signal  
Shield = Return Ground for all Signals

Inside the cut open Nav cable you will also see 5 other wires they are

Blue, Gray, Pink, Purple, Orange, and Shield Ground

Connecting the RX line with the Purple wire to either the Blue REMO line or the Gray TX line (I used Blue) is how you activate the Nav RGB input on your Kenwood Head Unit & it is necessary if you want to use this input if you do not do this the incoming signal will be ignored by the Head Unit and no video will be displayed you could also give the Purple wire 5 volts DC at 10mah if you feel like making a voltage regulator circuit. The Purple wire only needs a quick pulse to turn on the Nav RGB input. But it needs it every time you turn on the Head Unit. If you just solder the Purple wire to the Blue or Gray wire it will work every time. But you need to know that these are data buss wires and it may do some damage to the data buss in the long run. The best way of doing this is to use a micro controller or pulse timer to only send a quick 5v 10mah pulse to the RX line when the Head Unit turns on. **Please note if you are keeping your Kenwood Nav do not interface with these wires the Nav Unit will turn on the Nav RGB input for you when it turns on.**

The Pink & Orange wires are unknown and may be data.

All you need to do to get the video working is to send 5v at 10mah to the Purple wire then match and solder the RGB Signal wires listed above to the correct signal wires from your scan converter and shrink wrap them. Plug it all in and you are done.

**If you are keeping your Kenwood Nav Unit** you need to make a RGB switcher. To do this you use a 4PDT relay. Connect all the RGB grounds together. Then connect the RGB and Sync wires from the display side of the Nav cable to the common terminals of the relay connect the Nav side of the Nav cable to the normally closed side of the relay. Then connect your Scan converter to the normally open terminals of the relay. Make sure that the wires are connected in the right order do not connect the red wire from the Head Unit to the Blue wire from the Kenwood Nav and so on. It won't hurt anything if you do connect it wrong but it won't work right either. If the screen flickers when you switch the RGB input between the Kenwood Nav and the PC you can try installing a diode. To do this you need to connect the silver striped end of the diode to the + side of the relay coil and connect the other side to the - side of the relay coil it may or may not help depending on your equipment. Solder the switch in line with the relays + power wire. Job done test it and put it in your car.

## Touch Screen

The touch screen integration is where it gets hard look at the photo below.



The connector shown is the touch panel connector for a Kenwood DDX 7015 in the photo you can see the connector and the traces leading to the Kenwood touch controller that is integrated into the displays circuit board.

You must cut these traces between the connector and the Kenwood touch controller be careful not to cut too deep this board is a multi layer board and you could cut traces inside the board that you can not repair.

After cutting the traces you need to solder wires to the connector and the Kenwood touch controller. Follow the traces to the components of the controller and solder to them. This is very hard to do because everything is very small you will need SMD tweezers a magnifying glass and a good light to do this part. After routing the wires outside of the display you need to solder them to a 4PDT relay the connector wires go to the common terminals of the relay the Kenwood touch controller side wires go to the normally closed side of the relay.

Make sure that the wires are connected in the right order do not connect wire 1 from the connector to wire 4 from the Kenwood touch controller and so on. It won't hurt anything if you do connect it wrong but it won't work right either.

The USB touch controller needs to be soldered to the normally open side of the relay and the order for your Head Unit is going to be different from mine so to figure it out you need to solder some wires to the normally open side of the relay for testing. You will need to do some trial and error to connect your USB touch controller there are 16 possible combinations to connect it to the relay (4 wires x 4 wires = 16 wire combinations). With the Kenwood display off connect the relay to a 12v DC power source to activate it so the Kenwood touch controller is not connected to the touch panel and the PC touch controller input on the relay (the test wires you just soldered) are connected to the touch panel.

Connect the USB touch controller's wires to the test wires coming from the relay. Write down the combo you used. Hook up the USB touch controller to a PC that has the touch drivers loaded on it and touch the upper right corner of the touch panel if the pointer goes to the upper right corner of the screen and stays there after you let go.

Touch the lower left corner of the screen if the pointer stays there after you let go you have the right combo.

Make a note of where the wires need to be soldered to the relay then unsolder the wires you soldered for testing from the relay and solder the USB touch controller's wires to the relay in the correct order. If it does not work right try different combinations till it does work right. Then solder the switch in line with the relays + power wire. Don't forget to shrink wrap all the connections.

Reassemble the display and test the touch panel with the Kenwood and the PC. If the screen flickers when you switch the touch panel between the Kenwood and the PC you can try installing the diode. To do this you need to connect the silver striped end of the diode to the + side of the relay coil and connect the other side to the - side of the relay coil it may or may not help depending on your equipment.

#### How to switch to your Nav input on a Kenwood Head Unit

On all newer Kenwood Head Units you turn on your Head Unit & go to TUNER press the F or Function button once you now have a video and source control screen this means the screen will display video but when you touch the screen controls for the current zone 1 source (if your Head Unit has multi zone control) will be displayed at the bottom the source could be DVD CD Radio or Sirius push the F button again and you will have a video only screen when you touch the screen only a banner at the top of the screen with the name of the current video source will be displayed press V SEL or Video Select till the banner reads Navigation. You now have video

Recommended PC resolution for all Kenwood displays is 640x480 or 800x600 @ 60Hz this will give you the best image.

Recommended Scan Converter any converter with analog screen position adjustments digital is ok if the scan converter will retain settings when the power is cut and it must have a 12v DC or less power input the more you spend the better the image will be I choose a cheap converter because of this the colors are a bit dull and I need to read adjust the screen position every time I turn on the scan converter whenever a 16:9 aspect ratio resolution is used. It is not a problem if your using a 4:3 resolution like (640x480 or 800x600) I used a cheap one because I did not want to spend \$250 - \$300 to find out the screen was not good enough to use for a PC monitor. I spent \$150 on the scan converter to do this research now that I know it will work well I will spend the money on a better scan converter.

#### Audio input

As of now I have not been able to use the Nav audio input it requires a data string to activate it. I recommend using the VIDEO source audio input or a CD changer port aux adaptor for audio input.

#### Review time Kenwood vs. Xanarc

Ok straight up no BS on a scale of 1-10 Kenwood touchscreen vs. Xanarc with touchscreen the Kenwood is a solid 8 the reason it is not higher is that all LCD panels can have a screen door effect on the image it is a bit more visible on the Kenwood the image is also a bit blurry this could be due to limitations of the RGBS input on the screens controller card or a slight misalignment of the touch panel not likely because the panel uses micro balls and not a grid separator.

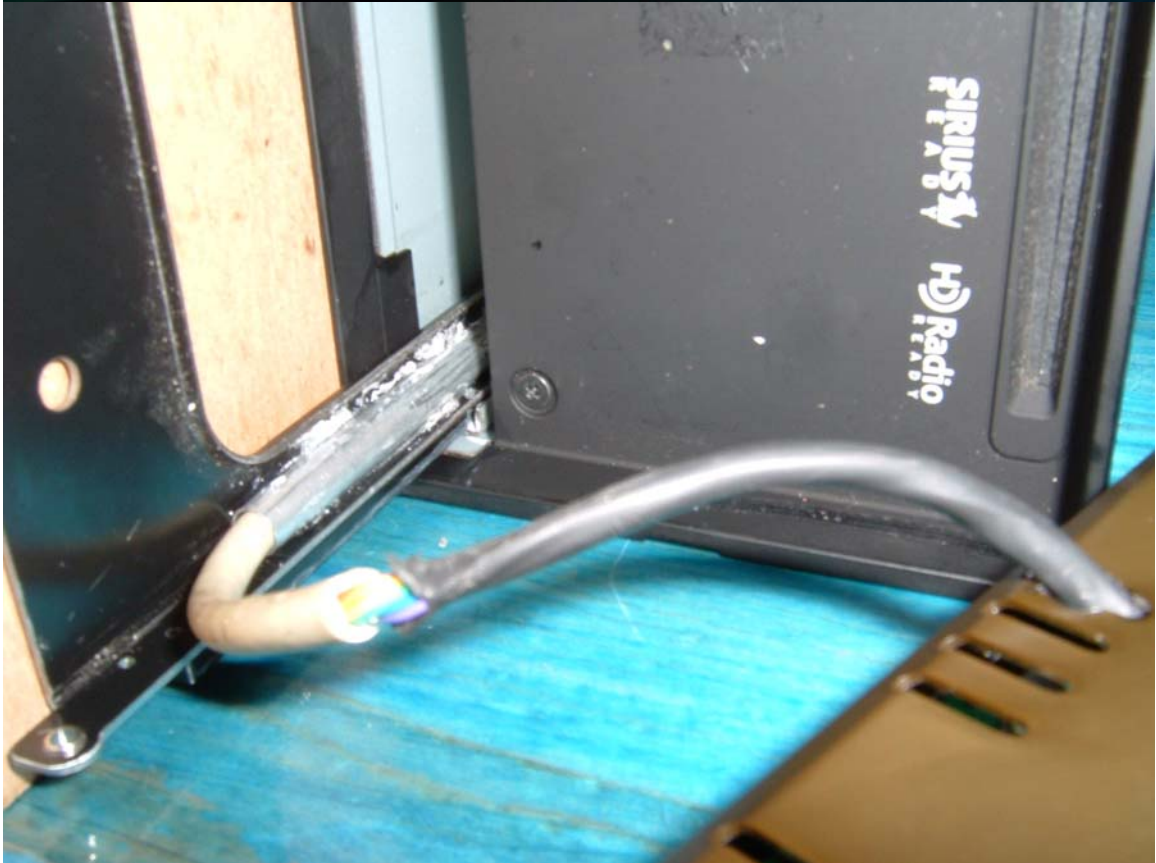
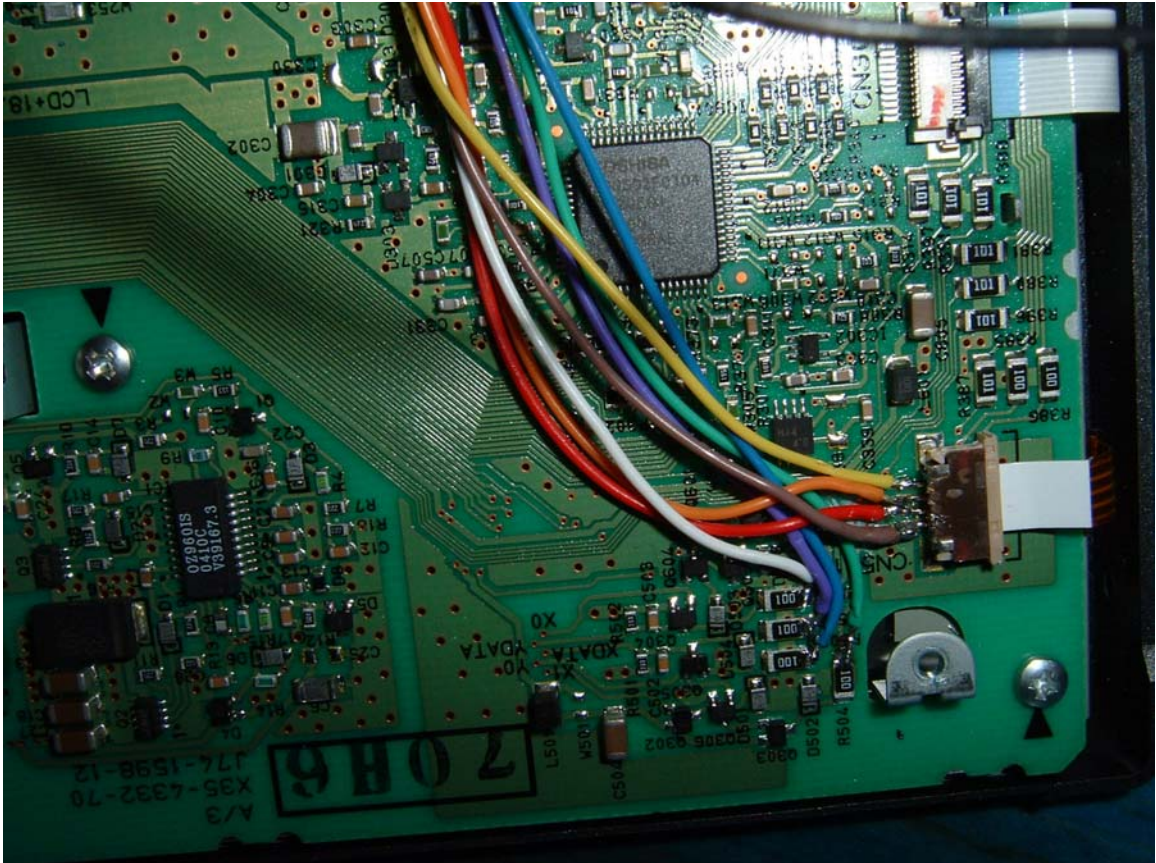
The appearance settings for windows can be adjusted to compensate for a lot of the Kenwood displays shortcomings I had to do so to read anything from 4 feet away without squinting keep in mind that this is a common problem with most small displays used for PC even Xanarc VGA displays.

### My recommendations

If you are only going to use the PC for nav and entertainment purposes music movies and games and don't have the room for or want a second screen mounted on your dash this is good solution you will be surprised how much better it is compared to a composite input.

If you plan to use the PC for reading intensive proposes like surfing the web or reading an ebook you should get a Xanarc or you will need some aspirin for the headache you're going to get. The image is very good but not good enough for doing a lot of reading.

Here are some screen shots and pictures of the DDX 7015 during the modification.







Good luck and for god sake be careful these Head Units cost a small fortune.