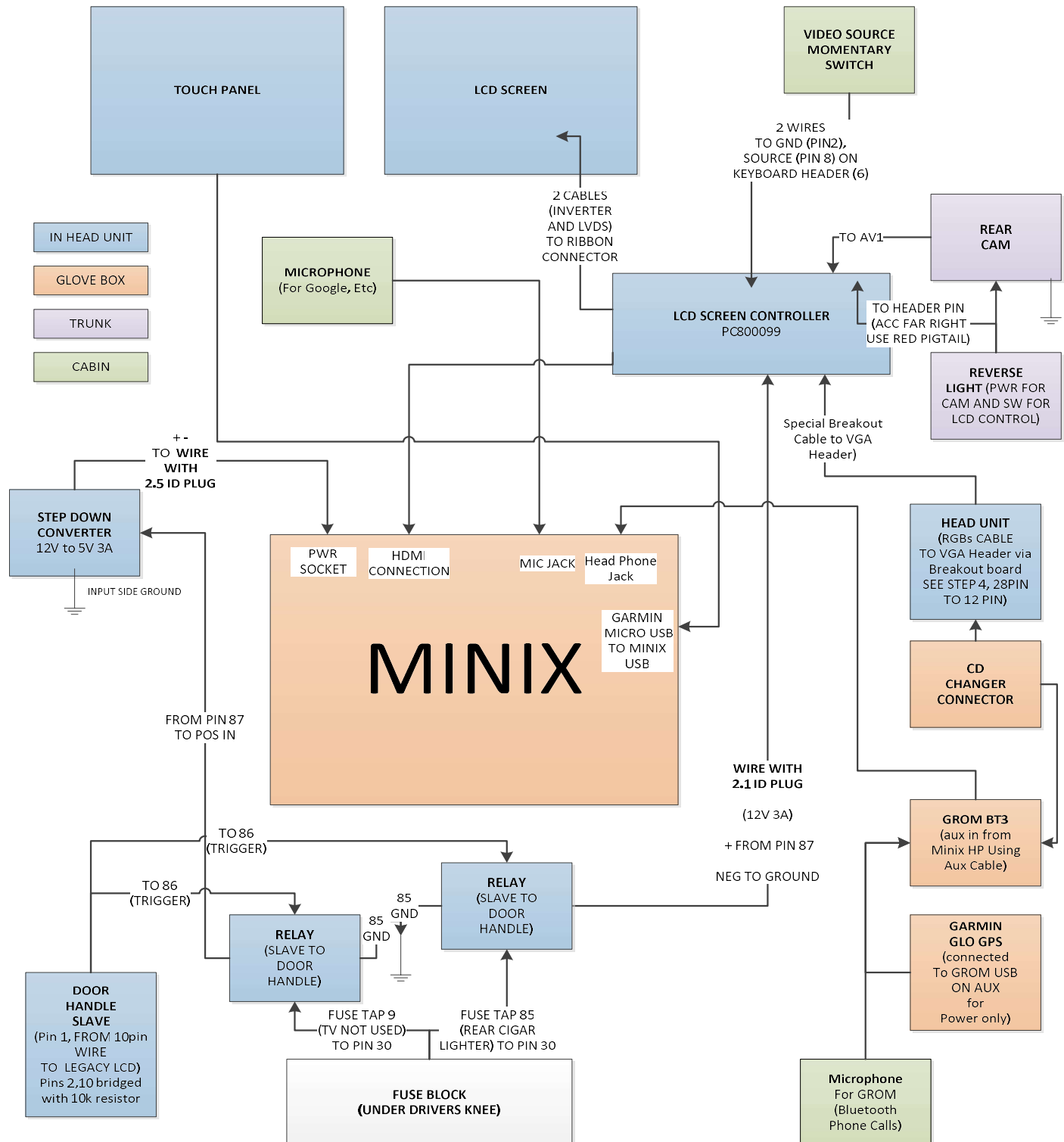


Warning: You might end up frying your Bentley head unit which is about \$1.5k to replace. If you're not comfortable, I recommend you ask a professional perform the electrical and electronic work.

Credits: VW forum, Openrtd2662, Sean, Daniel, Jaguar forum, lilo1980 / originally written by lilo1980

Document Info: Instructions to add hi definition touch screen and Android TV as Car PC to Bentley Continental GT/GTC 2004-2009, along with GPS and Reverse Cam.

Overview Diagram:



Tools you'll need:

1. Multi-meter
2. 12V DC top power supply.
3. Soldering iron, solder, flux, heat shrink tubing
4. Dremel (to cut an opening in existing faceplate as new LCD screen is slightly larger)
5. Electrical Tape and Wire Loom Tape
6. Wirecutter/stripper/crimper tool
7. Fuse Taps
8. Wire Splices

Parts Needed: LCD Panel, LCD Panel Controller, Touch Panel, Firmware Burner, Firmware, Audio Device (Grom, Denison, Neo, etc), See Appendix 1 for Details; **Optional:** GPS Receiver, Reversing Camera, Revers Camera Housing,

See the following for detailed parts pictures and sources:

Appendix 1 for Parts details

Appendix 2 for Files needed

Appendix 3 for In car wiring parts

Step 1: Read this entire document first and then Purchase LCD, LCD Controller, Touch Screen, CarPC (Minix U1), LCD Controller Firmware Burner, Cable for Connecting Old Head Unit, Bluetooth GPS, and Audio Device

Memorize the diagram on page 1!

Purchase all the parts in appendix 1 as necessary. Specs have been provided if you want to make substitutions but this guide has particular instructions for the parts listed and the accompanying software files that are changed as necessary.

You can also download the latest firmwares, updates, etc., but may need to use these files as it may not have been tested with the newer SW. For instance, as of this writing, SuperSU as a root method for the Minix box only works with Firmware12 and will not boot in Firmware13. Magisk, however, works with Firmware 13.

Finally read this document end to end several times so that you get an understanding of the parts, how they go together and the sequence of events.

It's helpful to hook up a full size USB Keyboard, Mouse and HDMI Monitor to get the Minix and drivers going so that you have a nice big screen to look at and ease of menu navigation and typing.

Also, don't put the whole thing together before configuring each part. Several things need to happen.

1. Minix Box:
 - a. Root (get access to rewrite 3 files that need to be edited in order to install the touch screen drivers) with SuperSU, Magisk, or your favorite program.
 - b. Copy over driver files for touchscreen
 - c. Install carpc useful apps
 - d. Install resolution manager and set resolution
 - e. Update to fw12 (supersu) or fw13 (magisk works as fw13 wont boot fully with supersu) or newest working minix os fw version.
 - f. Provide power source from car
 - g. Connect to LCD Controller (HDMI), Touch Screen, Microphone, Aux in of GROM
2. LCD: connect to controller, align with touch screen
3. LCD Controller: Replace firmware with custom firmware using special burner, create a special cable so that the 'legacy screens' can be displayed on the new LCD panel, provide power source from car, connect to lcd panel and rear camera.

4. Touch Screen: Ensure minix is set to auto start drivers, connect to minix, update firmware
5. Bluetooth GPS: Install Bluetooth app on minix and change settings in minix os
6. Rear Camera: Will need to be wired to reverse light for power. Also a signal from the reverse light is also needed to switch the controller to the video input instead of hdmi and back.
7. Toggle Button: This will be needed to switch from HDMI to VGA (VGA is the RGBs signal from the Bentley head unit)
8. GROM Audio Device: connect Bluetooth module, connect to headphone jack of minix, remove CD changer, connect to head unit
9. Microphone: connect to Minix and place in convenient location.
10. Fuse Taps: Find open fuses with the right amps.

Step 2: Setting up the Minix PC with latest updates, apps and touch screen drivers.

(This can be done with the MINI PC hooked up to an HDMI monitor, and USB Keyboard and Mouse, along with supplied power cable. Also be sure to connect to internet enabled Wi-Fi to download and update, etc.)

Helpful links below. Do not use the files from these links however unless you know they will work, as these examples may have different carpcs, touch screens, etc.

<http://www.minixforum.com/threads/new-minix-u1-ez-root-zip-method.9646/>
<http://www.minixforum.com/threads/neo-u1-with-a-touchscreen-monitor.12965/>
<https://www.chalk-elec.com/?p=2028>
<http://www.minixforum.com/threads/chalkboard-electronics-7-touchscreen.288/>
<https://magazine.odroid.com/wp-content/uploads/ODROID-Magazine-201402.pdf#page=4>

1. Update the MiniPC by running System update (NOT UPDATE&BACKUP)
2. Root the Mini PC:
 - a. Copy the following files on a USB thumb drive or SD card that fits into the Minix slot:
 - i. ezroot.zip
 - ii. recovery.img
 - iii. factory_update_param.aml
 - b. Turn on the Minix and navigate to My Apps
 - c. Select UPDATE&BACKUP
 - d. Under the Local update area Click on Select, Scanning will locate ezroot.zip, click on that.
 - e. Will return to menu, click the update button, and click update again
 - f. Unit will Power Off, flash and reboot
 - g. Select Reboot Now
 - h. Done... Download a terminal emulator program () and start this. Type SU and hit enter. You should see a # sign, indicating the root was a success.
3. Download the following additional apps from Google Play Store. (all are free) You only need Resolution Manager but the others will come in handy for copying files, etc., or are just neat to have in car.
 - a. Android Auto (car os, uses google maps – Automate is clone)
 - b. Waze (online gps map with social network of drivers – alerts for hazards, reported accidents, stopped vehicles, traffic)
 - c. Google Maps (sister to above product w/o social network)
 - d. SManager (script tool to allow touch screen driver to start on bootup)
 - e. The Weather Channel (or Weather Live)
 - f. Spotify, IHeartRadio and any other apps you like for streaming audio
 - g. Squarehome2, Nova or other launcher tool to allow you to customize the screen for car
 - h. Resolution Changer (Run this and Set resolution to 1920 x 950 and 240 dpi)
 - i. Bluetooth GPS

4. Install the drivers for the LCD Touch Panel (warning tape over all the ribbon cable, including the boards with clear packing tape or the equivalent such that there is no strain on the cable, it won't come off the glass and you can't short out the board during the positioning)
 - a. Create a Directory /system/lib/modules
 - b. Copy hid-multitouch-abs.ko to /system/lib/modules
 - c. Add insmod /system/lib/modules/hid-multitouch-abs.ko to /system/etc/install-recovery.sh

The instruction "Add insmod /system/lib/modules/hid-multitouch-abs.ko to /system/etc/install-recovery.sh" can be done through a terminal. Follow the steps below...

You must be root to do that.

- 1 - Download a app terminal, like "Terminal Emulator for android", at google play store.
- 2 - At the terminal open a text editor, I used the "vi". Command: "vi /system/etc/install-recovery.sh".
- 3 - At the vi editor, press the insert key of you keyboard (you will need a usb keyboard) to enter on the edition mode. Add, before the last line, the line: "insmod /system/lib/modules/hid-multitouch-abs.ko"
- 4 - Close the vi saving the file. Command ":wq" followed by an enter.

- d. Copy Vendor_04d8_Product_f724.idc file to /system/usr/idc
- e. Turn off the MiniX
- f. Plug in the touch screen
- g. Turn on the Minix
- h. Done, connect the touch panel to the Minix using USB mini to USB cable (same one can be used for updating firmware)

As an alternative to editing the install-recovery.sh file, you can use an app like script manager to run the "insmod /system/lib/modules/hid-multitouch-abs.ko" command and click the icons for root access and also for startup on bootup.

Step 3: Update the Touch Panel Firmware... see instructions from their website below. Do this before you connect it to the Minix. Also, don't worry, your usb mouse/keyboard and this device can all be plugged in at once and all work during the testing/setup phase.

Use file 7-of-mt-v2-4.hex

<https://www.chalk-elec.com/?p=1826>

1. Download [Bootload application](#), it is available as:
 - Compiled Windows application or
 - Sources for compilation on Linux and Mac OS platforms
2. Disconnect our panel/LCD from power supply, then:
 - for 7" LCD panel short pins 5 and 7 on J1 (pin 1 has square shape) shown in below photo with tweezers, after that, turn on power to board.

How to start HID bootloader

 - for 7" touchscreen short pins 1 and 2 on J1 of touch controller board as shown in below photo with tweezers, after that, plug in USB cable to board.



3. You should see LEDs on board (D1 and D2 on 7" LCD, and D1 on 7" touch controller) blinking alternately. You can remove the tweezers after that
4. Also, your PC should detect new device called "HID USB Bootloader" and HID bootloader software will inform that "Device attached".



Device is detected as a HID Bootloader

5. Then you should click button 1 in software dialog, select firmware file (.hex extension), and press button 2 to upload it. Wait until software inform that "You may now unplug or reset the device"

Step 4: Make cable to Connect Old Bentley display to new LCD interface connector

Order Breakout board

1. Order a breakout board: http://www.proto-advantage.com/store/product_info.php?products_id=3400023
2. Under Assembly, choose "Pin and Connector Assembled"
3. Under Connector Procurement, search "WM7951CT-ND"

This connector will be used to connect your old Bentley video feed to the new LCD controller

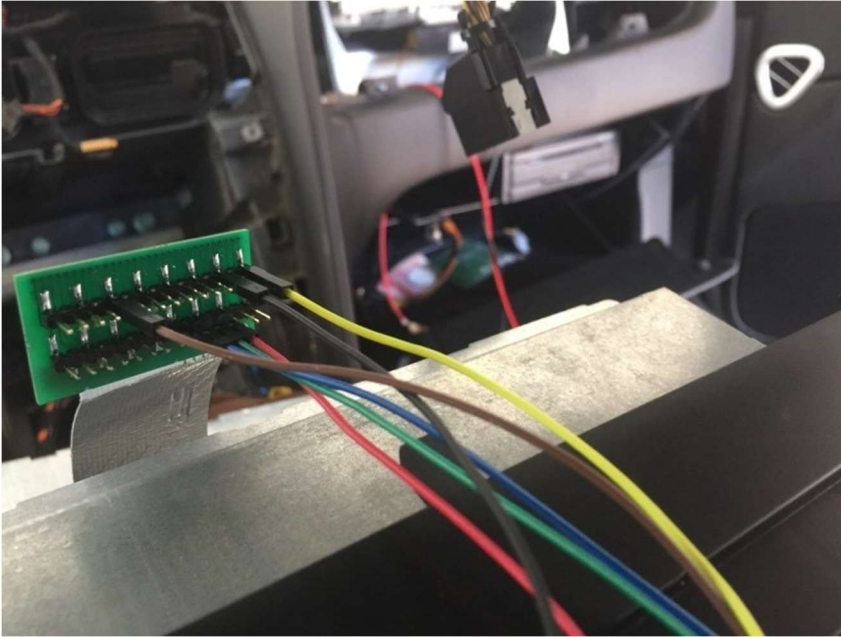
Build connector

1. The Bentley display connector has 28 pins but the connector we ordered has 30 pins. When you insert the ribbon cable, you will want to align the cable to one side so it will use pin 1 to 28.
2. On the breakout board, you will see some number indicate the pin position. We will be using these 5 pins only for our connector:
 - a. pin 5 = ground
 - b. pin 8 = red
 - c. pin 10 = green
 - d. pin 12 = blue
 - e. pin 21 = composite sync

3. Connect one wire to pin 5, another wire to pin 8, and etc.

NEEDED PIN	ORIGINAL	NEW
GROUND	5 brown	1
v/v	1 orange	2
COMPOSITE SYNC	21 yellow	3
RED	8 red	5
GREEN	10 green	7
BLUE	12 blue	9

4. You can use jumper wire for testing or directly solder the wire onto the pin. See lilo1980s image (I used silicone ¼" past the insulation to hold these pins in place and also insulate the exposed pins. Then covered in tessa tape.)



5. Leave this connector for now. In future steps, we will be connecting these 5 wires to the corresponding VGA connector like below (for testing)

Step 5: Prepare LCD Panel

Flash LCD controller to Openrtd2662 firmware

The reason we need to flash the firmware from original to Openrtd2662 is because original firmware does not support 15khz signal from the original Bentley display signal.

Flash LCD controller to Openrtd2662 firmware

The reason we need to flash the firmware from original to Openrtd2662 is because original firmware does not support 15khz signal from the original Bentley display signal.

1. You need a Windows computer with 32bit OS to perform this step. If you don't have a 32bit Windows, you can install VMware virtualplayer and install a 32bit Windows trial. If you've got a copy of Windows 2000, XP or Vista or XP 32 bit, will also work. I found that Windows xp had the fastest install time and no problems. (Win vista had problems with usb, and required tons of very large and slow installing updates. 15 minutes XP vs. several hours over several days for Vista, not to mention frustrating debugging efforts)

2. Get the LCD firmware; you can get it from www.openrtd2662.ru or PM me. If your project is successful, I encourage you to make a small donation to the project creator. (included with this project)
3. Install LCD programmer driver and connect wires
 4. Do this by running the x86 version of the installer file
 5. Run the exe. I used the 2.0 version (ISP_TV_2.0.EXE). For some reason, version 3 did not work for me.
 6. Load the Flash-555c.bin by clicking loadfile and navigating to it
 7. Connect the vga cable from black box to vga in on controller
 8. Connect the power cable for the controller
 9. Should get option 'isp'
 10. Click that and the flash process proceeds
 11. Should see text indicating success
 12. You're done

Step 6: Install Garmin Glo Software and Configure

See the below from their support page:

<https://support.garmin.com/faqSearch/en-US/faq/content/1BEq2yXIPj5SdcTfdXrdd6>

Pairing GLO with Android device

To pair and use the Garmin GLO with an Android device, please follow these steps:

Download and Install Bluetooth GPS from the Google Play Store. (Bluetooth GPS is a third-party application and is not affiliated with Garmin.)

Make sure the GLO is turned on:

1. On your Android device, touch "Settings".
2. Touch "Bluetooth".
3. Under "Devices", locate the GLO and touch to pair.

Once the GLO is paired, locate the Bluetooth GPS app and launch.

1. Touch the box to "Enable Mock GPS Provider" box within the app. Note: You may be taken to an Android settings page with an option to "Allow mock locations". If so, touch to check this option and then press the back button on the phone.
2. From within the Bluetooth GPS app, press menu (location may vary), then "Settings".
3. Under "Service Settings", Touch the "Reconnect" check box
4. Under "Connection Problems Related", touch the check box for "Use Insecure Connection".
5. Press the "Back" button on your Android device.
6. From the home screen of the Bluetooth GPS app, touch the "Connect" button to the right of the Garmin GLO. If you see data filling up the fields below, then everything is working properly.

To test further and ensure that GPS data is being received, touch the "Status" and "Map" tabs at the top of the application.

- Status: Displays satellite information.
- Map: Displays your location on a map.

At this point, the Bluetooth GPS application can be closed and location information should be obtained in other apps.

Additional Notes:

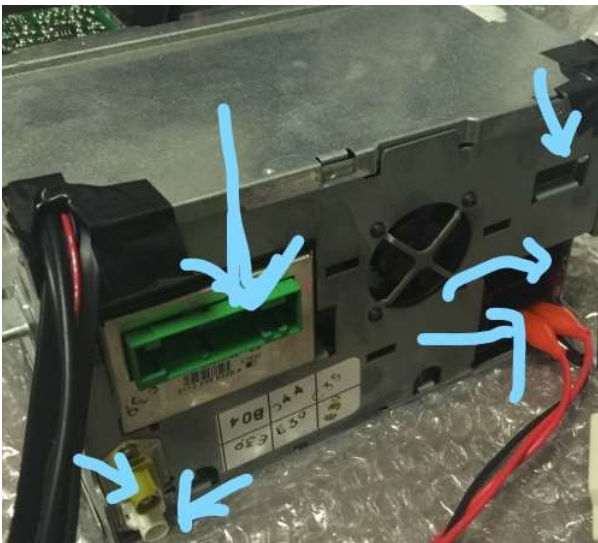
- Once connected to the Garmin GLO, you can completely disable the internal GPS receiver of your Android device. You can change this in the settings on your phone. The exact steps may vary by phone:
 1. Open "Settings" on your Android device.
 2. Locate your option for "Location", "Privacy and Security" or something similar.
 3. Most phones will have 3 options - use GPS and networks, networks only and GPS only. Select the option for network only. This will effectively disable the GPS on the phone.
- For your convenience, a widget (miniature version of an app) for the Bluetooth GPS application can be added to the home screen of your Android device. This would allow you to quickly enable or disable the Bluetooth GPS connection without having to open the application completely.
- Other third-party bluetooth GPS applications, such as the [Bluetooth GPS Provider](#) application, can be used as an alternative if needed. However, not every third-party bluetooth GPS application will work properly for the Garmin GLO.
- Garmin is not affiliated with third-party applications such as the Bluetooth GPS app. It is important to contact the proper developer if you experience any issues installing or using their applications.

This is also a good time to create a screen layout to make navigation easy. I used squarehome 2, which you can see in the final step.

Step 6: Removal of old equipment and installation

Remove headunit

1. I recommend you have the Bentley workshop manual to review the proper procedures of removing the head unit
2. Power off car (and disconnect battery; the manual recommended but I didn't; please follow proper battery disconnect procedure indicated in the manual)
3. Remove top vent (use plastic trim removal tools, and it just pulls up from the front. Two tabs in the back point to the front and hold it in)
4. Remove headunit facia trim (grasp in vents on either side of clock and pull the top straight back. Use trim removal tools to work the sides and pull back)
5. Disconnect all wire harnesses from fascia (theres 2, one for the clock and one for the rear temp controls)
6. Put car in neutral gear
7. Unscrew 5 screws securing the head unit (these are t20 torx)
8. Unplug head unit plugs (6 items, marked below in blue)



See youtube vides here:

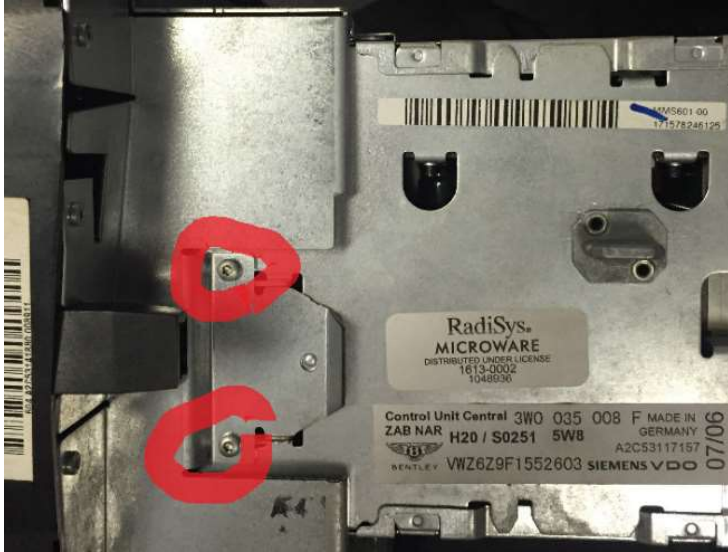
<https://www.youtube.com/watch?v=Q7oshf9UePY>

<https://www.youtube.com/watch?v=EW3-JIR-yGU>

Bonus – removing head unit to install Audio device: <https://www.youtube.com/watch?v=Rq5YNrJBik0>

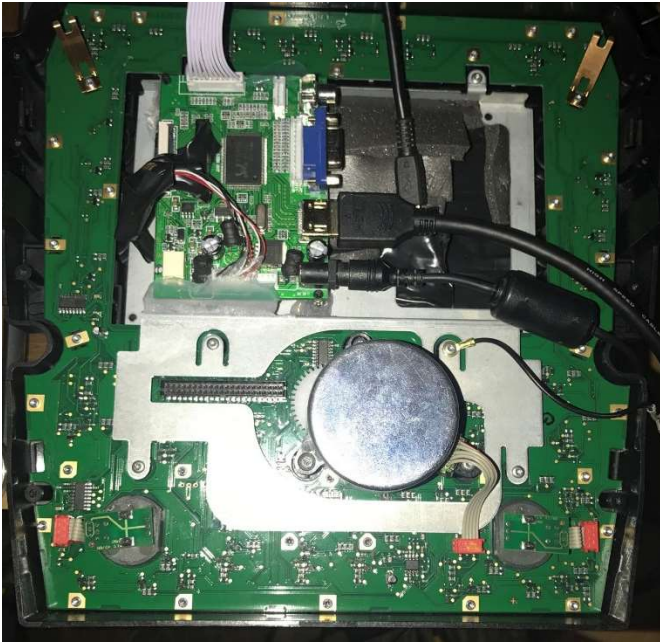
Disassemble head unit

1. First unscrew the two torx screws on each side and this will allow the front and back to separate



2. Next disconnect the ribbon cable to the board along with the flat ribbon cable to the lcd panel and the ground to the chassis. Be careful about the ribbon cable because they tear very easily and hard to replace
3. Remove the screws that hold the black plastic bezel to the front piece.
4. You should now have 3 pieces. Black bezel, lcd unit, head unit The lcd panel is removed by removing the frame on the back of the circuit board and then removing the 4 tiny torx screws.
5. To remove the black plastic from it's metal piece for cutting, remove all the tiny torx screws that have the gold colored squares under them. The 3 knobs pull off the front and the two smaller knobs have 11mm nuts holding them in. also remove the metal frame so that you can remove the old lcd panel. Below the new one is shown under the controller. You'll also have to remove the motor for the big central dial switch. All 3 knobs will need to be disconnected at the red connectors below. You should now have the black bezel and circuit board independent of each other.

The below image is the 'after' with the lcd controller attached to the back of the lcd panel frame, which hold the lcd and touch in place using foam to press them forward. Will make sense later.



Test LCD panel and control board

1. Plug in your any device HDMI device you have into the LCD controller board to make sure it works
2. The power plug is a common 3.5mm power plug. You might have an adaptor lying around.

Test original Bentley signal on new LCD

1. On LCD controller board, connect your breakout board to the VGA pins
2. Connect the Bentley ribbon cable to the pin socket
3. Switch to VGA input
4. Power on Headunit
5. You should see Bentley logo if everything works

How to power on headunit outside of car

1. Use alligator clips from a 12V source (I used a jump pack or booster pack you can get anywhere)
2. Two positive and one ground (these are labeled 30 and 31 on the head unit label that shows the connection next to the red 10a fuse)

3. 12V DC
4. Press power button after connecting power
5. Pins 2 and 10 from the 10 pin cable that used to go to the lcd screen will need to be bridge by a 1k resistor
6. Pin 1 will then be used to trigger the relays to turn on the Minx and LCD screen (via controller)

Below is the 10 pin cable and where it used to go on the LCD



Fitting New LCD

The new LCD is taller than the factory LCD so it is necessary to cut open the bottom of the headunit bezel in order to fit the new LCD display

Cutting

Once everything precious is removed and only the plastic frame is left, you're ready to cut.

1. Use masking tape and mask area you want to cut
2. Dremel away then sand down the rough edges
3. Test fit your LCD. The bottom edge should sit into the slot you cut out. You should wrap some masking tape around the LCD to prevent it being scratched
4. If everything fits well, then wash the plastic pieces and refit everything



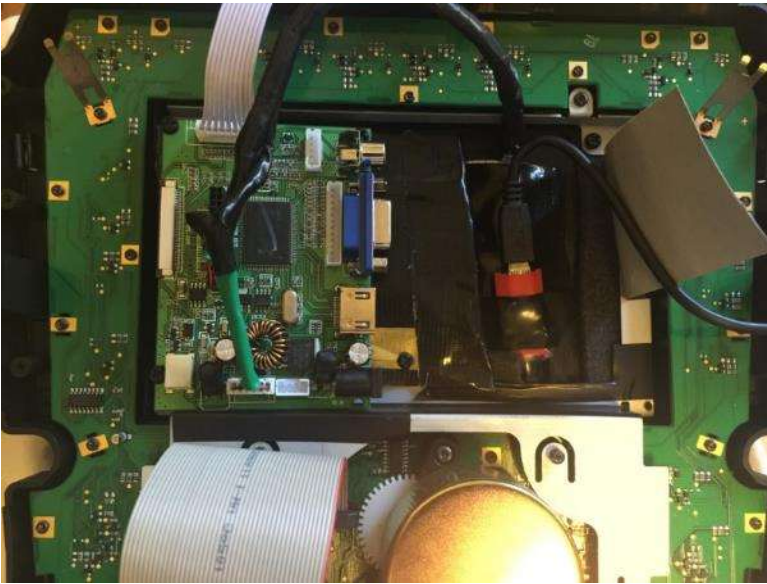
Test fit LCD

1. Use electrical tape to temporarily tape the touch screen to LCD panel
2. Once you've got the touch panel and lcd to fit, hook up the controller to minix hdmi, rear cam and head unit vga,power, buttons, etc and make sure everything works.
3. Mount the controller to the back of the panel

I used spring standoffs and dow 700 silicone. Lilo1980 fabricated a metal panel. His notes below...

Instead of making an elaborate frame for the LCD, I decided to use simple foam to secure the LCD from moving. Behind the foam, I use some sheet metal and use the existing LCD to hold and made a holder for the controller. This frame will press the foam against the LCD to secure it. Be careful not to apply too much pressure to the LCD. I only tighten the original frame screw to about 50%

Pics of the approaches.. They look similar as I followed lilo1980's lead



Once that is all working put the 3 components all back together. Careful to go slow and test fit before tightening things down.

The LCD Controller will have the following connections

- 2 cables to LCD panel
- AV input from rear cam
- Reverse light to ACC pin above AV input
- VGA input from breakout connector pins
- Button/IR setup + add'l source button on pins 2,8
- HDMI Input
- Power in from fuse tap 85 via relay

Step 7 – Installing

I found that using solder seal connectors worked well for joining wires and that any connections of 3 or more worked well with wire nuts of the appropriate size.

The following will be the add'l wiring from the head unit.

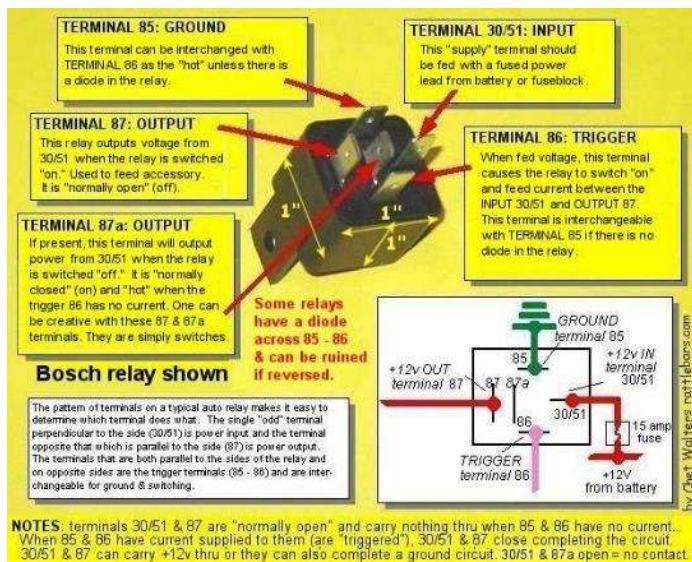
1. HDMI cable to Minix

2. USB to Touch Panel
3. Ribbon Cable with IR and LCD Buttons
4. Video Cable from Rear Cam
5. Power from Rear Brake Light to ACC pin on AV input
6. Power cable from relay from fuse tap 85
7. Pin 1 from 10 pin connector

The Minix will have the following Cables

1. USB from Touch Panel
2. HDMI to LCD
3. Microphone In from below 'speaker grille'
4. Headphone Out to Grom Aux In
5. Power in from relay Fuse tap 9

The relays will be triggered by pin 1 of the 10 pin connector. A wire from here can be split and used to trigger both relays at terminal 86. I found the below helpful in wiring up the relays.



See the diagram on the 1st page on how this is wired.

Terminals 85 both go to ground.

Terminals 30 get power from the appropriate fuse tap. (9 (tv tuner, 5A) for the minix and 85 (rear cig lighter, 15A) for the lcd controller.

Terminals 87 go to the positive side of the plugs (center pin) (via dc-dc 12v to 5v 3a step down converter)

It helps to first get the head unit connected and the hdmi/usb cables into the area above the glove box. This can be accessed by pulling the veneer panel off with two suction cups.

From here, the glove box can be reached.

In my case, I place the minix, relays, grom and garmin unit all in here so that the glove box was left unaltered.

Next, I ran the wires from the fuse taps to the area from the center console. Pushing these wires between the leather center console where it end and up will get you there with trial and error.

The mics (both for grom and minix) I stuck onto the center speaker grill looking thing, which actually cover some air vents.

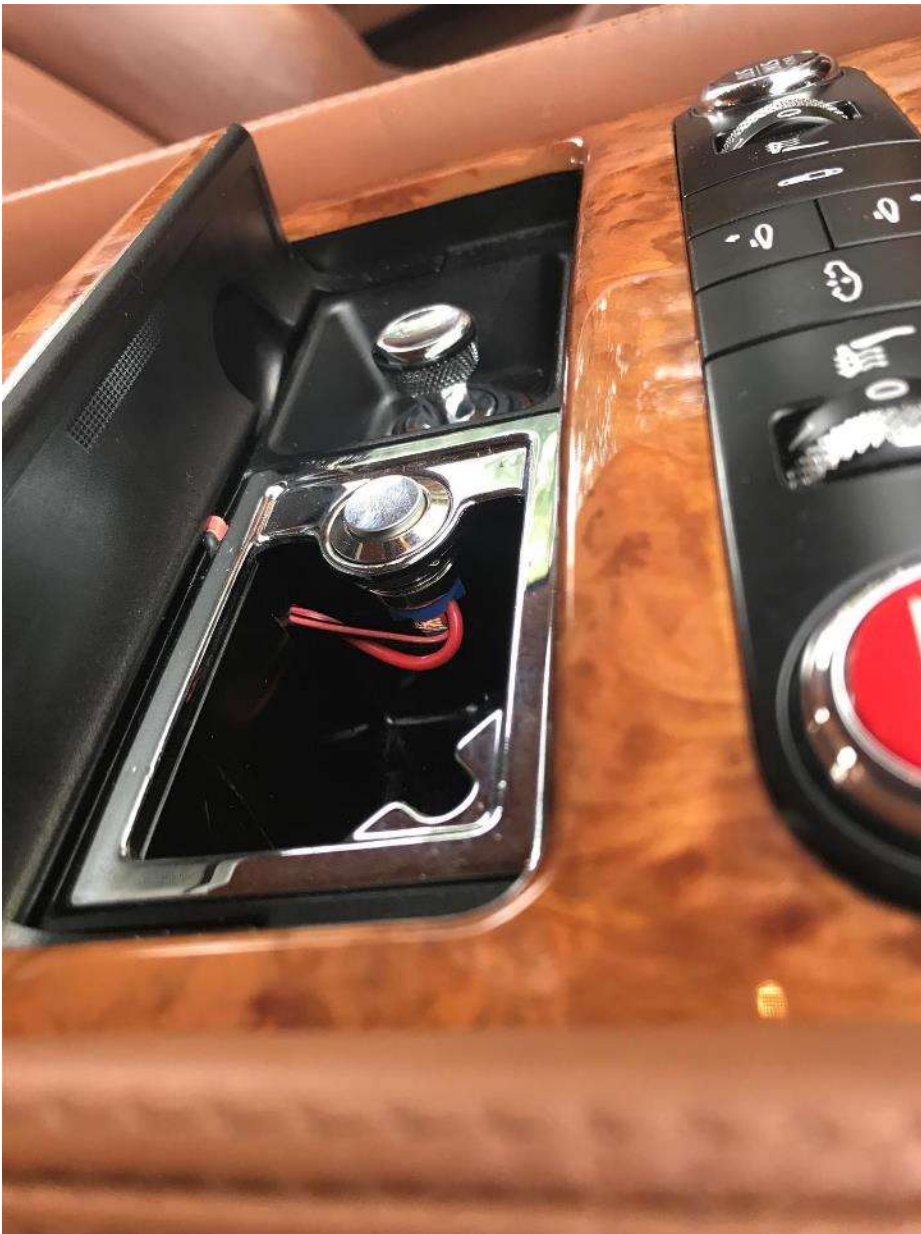
I was able to also take the button panel that came with the lcd controller and place it at the lower half of the vent for the passenger side next to the clock. This way, with the plunger open, the IR is in sight of the remote for the lcd panel.

I ran one button from pins gnd and source (2 and 8) to a button in the ash tray to allow for changing the source easily.

The source button was pretty easy and only took 5-10 minutes.

1. Remove ashtray from holder (I had to lift the center trim panel to push up from underneath).
2. remove top cover by prying back the metal tabs that hold it onto the plastic 'bucket'.
3. Remove the Round black plastic thing (cigarette holder, I think) by prying back 3 tabs.
4. Using a dremel drum widen the hole until your button just fits in where the black plastic thing was..
5. Drill a hole in the back so the wires can feed through. Make them a bit longer, so it's easy to wire to your button.
6. pull wires through plastic and route under transmission hump trim and to left of head unit to appropriate header pins.

The pic below shows the wiring and can only be seen if someone puts their head next to the ashtray where one would normally be sitting.



Here's how it looks normally




Once everything is in place, start putting the panels back in.

1. Connect everything per the diagram.
2. Route microphone wires to minix and grom. I coiled these together with twist ties as there's way to much length than whats needed.
3. Place the button/ir board at the right location and secure with tape
4. Route the button wire from the ash tray under the center console
5. Install the center console trim by pushing it down into place
6. Install Head unit with 5 torx screws
7. Install the head unit fascia trim by pushing into place
8. Install the 'speaker grill' looking cover
9. Install the veneer panel above the glove box
10. You're done!

End result





Appendix 1 Parts Detail:

PART	PART NUMBER I USED	COST	SOURCE I USED
7" 1280 X 800 LCD PANEL	N070ICG LD1	US \$45.60 + FREE SHIPPING	http://www.ebay.com/itm/7-LCD-Screen-N070ICG-LD1-1280x800-IPS-LCD-Display-39Pin-Connector-/360935606368?hash=item5409704860:g:sUoAAOSwX61ZI~np
 <p>7" N070ICG-LD1 1280X800 LCD Screen: Display Mode TN, Normally White, Transmissive Resolution 1280×800 Outline Size 161 × 107×4.5 (H×V×D) Display Area 149.76 × 93.6(H×V) Brightness 400 cd/m² (Typ.) Contrast Ratio 800:1 (Typ.) (TM) Viewing Angle 89/89/89/89 (Typ.)(CR≥10) [Left / Right / Up / Down] Signal Interface 39 pins LVDS (1 ch, 8-bit) , Connector Backlight WLED Input Voltage 3.3V (Typ.) Packing list : 1× 7inch N070ICG-LD1 1280X800 LCD Screen 1× LVDS Cable</p>			
LCD PANEL CONTROLLER	Model No: K000418	US \$28.49	http://www.ebay.com/itm/HDMI-VGA-2AV-Remote-Lcd-controller-Board-VS-TY2662-V1-work-for-lots-of-LCD-panel-/180979602491?hash=item2a2339943b:g:AuQAAOSwPe1Tyexq



- 1.Power Supply(5~18V)
- 2.HDMI
- 3.VGA Connector
- 4.AV1
- 5.AV1+AV2
- 6.Keyboard
- 7.TTL Signal 50Pin
- 8.LVDS Signal 1/2 Ch. 6bit 8bit
- 9.12V Backlight
- 10.Inverter Connector

TOUCH PANEL	7" open frame capacitive multi-touch panel (ratio 16:10)	\$39.99+17 shipping	https://www.chalk-elec.com/?page_id=1280#!/7-open-frame-capacitive-multi-touch-panel-ratio-16-10/p/39527272/category=3094846
	<p>Easy installation – just connect to USB and it will work Mini USB connector for touchscreen with HID protocol Driver-less single touch (installed by default) functions Multi-touch up to 5 fingers (available with firmware update) with additional driver Aspect ratio: 16:10 (widescreen) Active area: 152mm (H) x 95.5mm (V) Surface treatment: 3H glass, Glare Operating temp: -20C ... +70C Storage temp: -30C ... +80C</p>		
USB port programmer for LCD driver RTD2660 RTD2662	USB port programmer for LCD driver RTD2660 RTD2662 RTD2668 MSTAR 703 705 ASK	US \$74.10	http://www.ebay.com/itm/USB-port-programmer-for-lcd-driver-RTD2660-RTD2662-RTD2668-MSTAR-703-705-ASK-/360643963853?hash=item53f80e2bcd:g:zHcAAOSwQSZXPuTZ
	<p>Please download the upload firmware instruction before buy this USB port programmer: Support Chip RTD2120 RTD2660 RTD RTD2668 ARK Most of Mstar 702 703 705 717 V26 and so on. Not support such as 6M16 6M1818 based on MIPS.</p> <ol style="list-style-type: none"> 1. Power Supply 12V used for burn offline. Burn Online: USE USB Cable. 2. USB Port: Connect PC 3. Good (Green LED) ON: Connect the PC. Flash: Program Online Program (Green LED): Flash: Program Offline ERROR (Red LED): ON: Error 4. Switch: Next to Red LED:IC2.The other side: Uart. 1): Selection IC2: RTD2120 RTD2660 MST 2): Selection Uart: RTD2668 ARK <p>VGA: connect Controller board used for upload firmware. 4Pin 2.0 connector: SCL SDA GND GND Connect with our controller board (Package not included driver board): Package content: 1x USB port programmer Support Win CE Win XP Win7 1x USB Cable 1x VGA Cable 1x 4GB USB disk including Our controller board Specification and firmware file</p>		

Android TV device	MINIX NEO U1, 64-bit Quad-Core Media Hub for Android [2GB/16GB/4K/XBMC/KODI]	\$109.99 & FREE Shipping	https://www.amazon.com/MINIX-U1-64-bit-Quad-Core-Android/dp/B018K36GMV
-------------------	--	--------------------------	---




H.265 HEVC Main-10
4K HEVC Hardware Decoding (Supports up to 10bit, 4K@60fps)



Processor	Quad Core Cortex A53 Processor (64-bit)
GPU	Pentia Core Mali-450 GPU
Memory	2GB DDR3
Internal Storage	16GB eMMC 5.0 Storage (MLC)
Wireless Connectivity	802.11ac 2x2 MIMO Dual-Band Wi-Fi (2.4GHz/5.0GHz), Bluetooth 4.1
Operating System	Android™ Lollipop 5.1.1
Video Output	HDMI™ 2.0, up to 4K@60Hz, Supports HDMI-CEC
Audio Output	Via HDMI™ 2.0, 3.5mm stereo jack, optical SPDIF
Peripheral Interface	RJ-45 Gigabit Ethernet - Supports hotspot sharing via Wi-Fi Micro SD card reader USB 2.0 port x 3, OTG port x 1, Kensington lock ready Microphone jack, Headphone jack, IR receiver (remote included)
Power	DC 5V, 3A adapter included (CE, FCC certified)
Supported Video Format	DAT/MPEG/MP4/MPEG/TS/19/VOB/ISO/AVI/MP4/MOV/3GP/FLV/MKV/10/15/18/24/30/48/72/1080/2160/4K
Supported Audio Format	MP2/MP3/WMA/WAV/OGG/OGA/FLAC/ALAC/APE/AAC


NEO U1 showcases the latest wireless advancements with the inclusion of 802.11ac 2 x 2 MIMO Dual-Band Wi-Fi (2.4GHz/5.0GHz), combining both an internal and external antenna to accomplish lightning-fast, flawless streaming. NEO U1 also features Gigabit Ethernet for those who prefer a wired connection. NEO U1 is built for the video purists, delivering an incredibly rich and intense cinematic experience. NEO U1 supports up to 10-bit colour format, significantly increasing the dynamic range of colors displayed, adding new depths and vibrant picture quality not found on previous Media Hubs for Android. NEO U1 offers improved application performance and responsiveness thanks to running Android Lollipop 5.1.1 OS. While MINIX's exclusive launcher presents a clean, well-designed and accessible interface that makes finding what you want easier than ever. Our F.O.T.A (Firmware-Over-The-Air) Update System means all updates will be available to download and install automatically onto your NEO U1. NEO U1 has been crafted to perfection, packing an astonishing array of industry leading features into a sleek and compact design. Likewise, the silent thermal control management system means you'll never be disturbed by noise while enjoying all the entertainment at your fingertips.

GPS	Garmin Glo	\$99	https://buy.garmin.com/en-US/US/p/109827
-----	------------	------	---



Unit size, WxHxD: .70" x 1.65" x 3.04" (1.78 x 4.19 x 7.72 cm)
Weight: 2.12 oz (60.1 g)
Receiver Technology: GPS+GLONASS
WAAS: Yes
Update Rate: 10 Hz
Accuracy: 3 meters
Battery Capacity: 1100mAh
Battery Life: 12 hours
Hot Start Time: 3-5s
Warm Start Time: 35s
Cold Start Time: 60s

Reverse Camera	VEIPAO 8 LED Night Vision Car Rear Camera	\$14.99	https://www.amazon.com/gp/product/B06XHFGSM1/ref=od_aui_detailpages00?ie=UTF8&psc=1
----------------	---	---------	---





【HD NIGHT VERSION】 Rear backup camera for a car Upgraded to 8 high brightness white LEDs for improved night vision. High resolution visibility and back-up image capabilities. Backup cameras with night vision no need to worry about blind spots when reversing your car.

【170° WIDE VIEWING ANGLE】 8 LED car rear view camera backup equipped with a 170° wide viewing angle this rear camera is perfect for checking unseen blind spots in your vehicle's mirrors when reversing the car. Perfect for avoiding car crashes while driving in the dark.







【WATERPROOF & SHOCKPROOF DESIGN】 Car backup camera for trucks with IP68 design completely waterproof, so don't fear driving on a rainy day. Backup cameras for cars is also shock resistant to provide a better performance and guarantee safe driving.

【UNIVERSAL MOUNTED】 The butterfly sized universal mount can be installed on all 12V cars. Different position can be achieved with the adjustable camera. this rear view camera for car can also be used as front or rear view backup camera.







【EASY TO INSTALL AND USE】 Vehicle rear view cameras for cars easily mounts to your vehicle's license plate. Paired with the in-vehicle monitor, this powerful hd backup camera for car is equipped with true color reproduction and a resolution of 520 TV lines.

Bluetooth Module	GROM BT3	\$115	http://gromaudio.com/store/bt3_adapters/vw_skoda_seat_bentley_98-10_bluetooth_adapter_interface.html
<div>  <p>Integrated Bluetooth Car Interface adds Hands Free Calling and Wireless Audio to the original factory stereo of many cars. The system comes with built-in Bluetooth and microphone. GROM-BT3 module has two extension ports that can be used for Aux-In, HD Radio and iPod or iPhone integration with optional cables that are sold separately.</p> <p>Bluetooth functionality: Use your phone in the car hands free (HFP), stream your MP3 music from your phone to the factory stereo via Bluetooth Audio playback (A2DP), control your MP3 music with the car stereo or steering wheel controls via Bluetooth wireless audio control (AVRCP). Bluetooth compatibility: all Bluetooth capable smartphones, including latest Galaxy S series and iPhone.</p> <p>Optional AUX-IN cable (sold separately): Add 5FT 3.5mm audio AUX cable for direct audio connection. The 5V USB charging connector will charge most of the Smartphones, including iPhone and Android. USB port on the auxiliary cable 35USB is for charging only, it will not let you to play the music directly from USB stick or Android phone. If you want to play the music from USB stick or integrate Android phone - please consider GROM USB MP3 Kit</p> <p>Optional HD Radio Tuner add-on (sold separately): Get HD FM Radio stations from your factory stereo. GROM-HDR1 HD Radio tuner improves the sound quality of local FM stations and delivers clear and bold sound. Adds access to the HD FM sub-stations for more music choices. Check out the HD Radio Tuner and Antenna Dongle</p> <p>DashLinQ Android Car Mode App available at Google Play Store It becomes easy and safe to use your phone while driving for music, phone calls and navigation. Works great with GROM-BT3 Bluetooth car kit. For more information go to DashLinQ page</p> </div>			
Reverse Camera Housing	3W0 807 210 B	\$15	https://www.aliexpress.com/item/Volkswagen-Scirocco-golf-MAGOTAN-GTI-Phaeton-RGB-camera-reversing-video-support-Scirocco-RGB-camera-bracket-VW/32375155875.html?spm=2114.search0104.0.0.UQsh5e
<div>  <p>RNS510 RNS315 RCD510 RGB camera bracket Reversing image support FOR VW Scirocco golf PASSAT GTI Phaeton 3W0 807 210 B</p> </div>			

Appendix 2 Files

Component	Usage	Files
Root Files	To allow modification of the Minix PC for installing drivers for touch screen, etc. Placing these on a FAT formatted thumb drive or card that fits in the TF slot will do the job.	<p>3 Files: recovery.img, ezroot.zip, factory_update_param.aml</p>  <p>ezroot.zip</p>  <p>factory_update_param.aml</p>  <p>recovery.img</p>
Touch Screen Drivers	Allow Minx U1 to work with LCD Touch Panel	<p>Hid-multitouch-abs.ko, Vendor_04d8_Product_f724.idc</p>  <p>Vendor_04d8_Product_f724.idc</p>  <p>hid-multitouch-abs.ko</p>
Touch Screen Firmware	Update to version that works with Minix U1 and drivers	<p>Use 7" Open Frame, Multi Touch, Version 2.4</p> <p>7-of-mt-v2-4.hex</p>  <p>7-of-mt-v2-4.hex</p>
LCD Controller Firmware	To allow the screens for the stock HVAC/Radio/Car Info/Navigation/Trip Computer, etc. to be displayed on the new screen	<p>Flash-555c.bin from www.openrtd2662.ru</p>

Appendix 3 - Power Supplies

Item	Volts / Amps	Connector	Notes
MINIX U1	5V / 3A	5.5 od / 2.5 id Female	This will need a cable from 12V fuse tap, going into step down converter, then cable with the 5.5/2.5 round male plug.
Step Down Converter for Minix	Outputs 5V 3A	Bare Wires	 https://www.amazon.com/gp/product/B06WVLFYJH/ref=ox_sc_act_title_5?smid=A2W6NJ3JRQO8JZ&psc=1
Cable for Minix		5.5 od / 2.5 id Male and Bare Wires	 https://www.amazon.com/gp/product/B000L FVFK8/ref=ox_sc_act_title_3?smid=ADHMH EVZ2ZDV0&psc=1
Fuse Tap	10A Fuse	Bare Wire and Fuse Blades	 https://www.amazon.com/10-Pack-Add-circuit-Adapter/dp/B01DYQM6EO/ref=pd_sbs_263_1?encoding=UTF8&pd_rd_i=B01DYQM6EO&pd_rd_r=123MKG TW3NCNQPEYE30N&pd_rd_w=vqSg4&pd_rd_wg=cm Eui&psc=1&refRID=123MKG TW3NCNQPEYE30N#Ask
LCD Controller	12 V / 3A	5.5 od / 2.1 id Female	This will need a cable from 12V fuse tap to cable with the 5.5/2.5 round male plug.
Power Cable for LCD Controller		5.5 od / 2.1 id Male and Bare Wires	 https://www.amazon.com/gp/product/B00BY8 LA0G/ref=ox_sc_act_title_2?smid=ADHMH EVZ2ZDV0&psc=1
Garmin Glo	5V / 2A or less	Mini USB	Plug into Minix U1 USB Port
Relays/ Sockets	12V / 40A	Bare Wires	 <p>These are used to have the door handle turn the items on or off instead of on all the time. (depending on where you put fuse taps)</p> https://www.amazon.com/gp/product/B01KH17W KM/ref=ox_sc_act_title_1?smid=A180VU3KH6ZV F2&psc=1
Toggle Button	Yueton DC 36V 2A	Screw Terminals to Bare Wires	 <p>16mm High Round Cap Waterproof Metal Momentary Push Button Switch High Flush Reactable Screw Terminals</p>