

# How to install a High-Tech Multimedia solution in your BMW – Using CarX



## Introduction

I wrote this document for a number of reasons:

1. Firstly, I felt that I wanted to tell others the things I found out when looking at how to install a PC and multimedia system into my BMW – a 2001 E39 M5 with factory Widescreen TV, Sat Nav, GSM Phone, 6 CD changer and trafficmaster.
2. Secondly, I wanted to tell other about CarX – the software that I use in my specific car. I do not have any association with CarX, but I simply wanted to tell others about my experiences with it and how good it is.

Over the period of about 4 weeks I have been looking at all the activity in installing a multimedia PC based system into my car. I spent much time going through various sites trying to understand what people have done and how I could go about doing the same thing to get multimedia in the car.

The problem was that there is a lot of information out there and it is hard to put it into a meaningful order. I ended up reading through loads of different articles and piecing together the various things required.

So I decided to write this document to show others where to get the key information to be able to install a PC in their car and run up a suitable software package to run MP3's and Movies.

The thing to note is that can be done for a very small sum of money. For example, assuming that you have a spare PC/laptop then the whole project could cost less than £20 (GBP). If you have to source a PC, I would suggest looking on places such as EBAY for a cheap second-hand one. A laptop is useful in terms of size and portability.

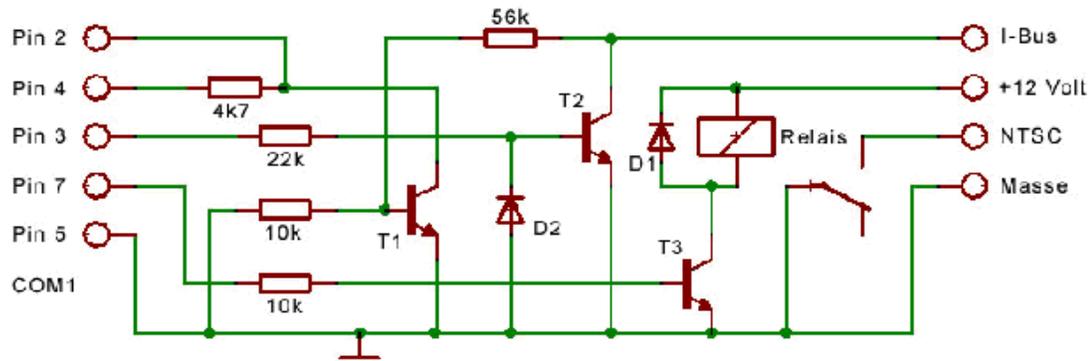
I found a really good site documenting the installation of a CarAMP PC into an E39 touring, loads of pictures, but in German. You can see it here (<http://ulischirm.gmxhome.de/caramp/caramp.htm>). I used babelfish.altavista.com to translate this into English.

## Things that can be confusing

There are a number of things that can be confusing and I thought it would be good to know what I found out.

- 1) **Which input do you use to connect the video of the PC to the car screen** - I found the pin diagram for the video module in the boot of the car, and I initially thought that because I had the TV video module and that it had an AV input I could use that. Problem was that the TV switches to a safety warning screen when the car is moving, now you can get a module to enable your TV to show all the time, but the problem here is that even if you did do this, one of the features of the software that you can use is that it reacts to the right hand knob of the TV screen, if the TV is in AV mode then as soon as you touch the right had knob the TV screen puts up it's own display and therefore means that the AV input is not very useful for a PC based multimedia system.
- 2) **Ibus Interface, the interface between your PC and the car network** – There are many different sources for Ibus interface that can enable your PC based software to interact with the Ibus network in the car. You can buy them or you can make them. The basic interface can be as simple as a receiver, or a receiver and transmitter, or a transmitter, receiver and also a switcher. There can also be a more advanced version that senses other traffic on the network and enables the software to handle potential collisions of data. To be honest, I found that what I needed was a receiver (so that the software can receive the messages being generated on the Ibus network and also a switcher (this is important as the software will automatically engage the switch to change the video screen from the main BMW computer to the PC software). So, once I learnt that, I went about finding some where to make my own one, I found some very useful information on [www.varan.org](http://www.varan.org) about interfaces and then I found this interface on

(<http://ulischirm.gmxhome.de/caramp/caramp.htm>), which was perfect and works with all the key software and provides both receive and transmit and the relay switching:



- a. The components used were:
- i. BC109 transistors for T1 and T2
  - ii. BC108 transistor for T3
  - iii. Diodes 1n4148 for D1 and D2
  - iv. The relevant resistance values for the resistors
  - v. A suitable small 12v relay, single pole single throw.

If you are not onto making your own one, check out or post on the yahoo-forum called "hacktheibus" – people like Rolf Resler sell them for prices between 15 and 40 €.

To be honest, if you can handle a soldering iron, it really isn't difficult to build, the components are not sensitive and as long as you check and double check then you shouldn't go wrong. **But if you do build it yourself, you must really check things before connecting to your Ibus!!!!**

- 3) **Power supply** – you need to source a good power source for your PC. One of the reasons why I chose a laptop (apart from the fact that I had one spare) was that it can run off of batteries and you can easily source a simple adaptor that takes the car's 12v battery and changes it to what the laptop needs. Secondly, I wanted to run the adaptor and hence laptop off of a 12v source that is only live when the ignition is switched on. Now that can be difficult when you are looking to put the PC in the boot. What I did, is that I found a relay that was being engaged when I switched on the ignition and took a feed off of this for the adaptor.
- 4) **Video interface** – The main thing that you need to be aware of is that you will ultimately be connecting your PC to an NTSC input on the car's video module (rather than the PAL interface) or the main RGB interface. So, you will need a composite video interface for your PC. Either you have a PC that comes with an NTSC capable TV-Out graphics card or you use video converter to take normal SVGA connector to an NTSC composite video signal. This is the better solution for both quality and scaling reasons. I found a really good one at [www.maplin.co.uk](http://www.maplin.co.uk) for £40. This in fact gave me NTSC, PAL and RGB connections. You could connect up the RGB interface to the main RGB inputs into the video module but that would require more work from the IBUS switching interface components because you would have to switch over three different video feeds (Red, Green and blue) rather than the use of the NTSC interface. I eventually found out that people were using the NTSC reversing camera interface for the video aspect, this means that the screen is on all the time, BUT to enable the reversing camera interface you need to switch pin 17 of the video module to ground – this is where the Ibus switching interface comes in, because the software supplies a positive feed on the RTS line of the serial port to the Ibus interface and your Ibus interface then switches a relay that supplies the required ground to pin 17 and thus switches the screen over to the reversing camera input which will have your PC video connected to it.
- 5) **Audio interface** – Well, this had me thinking for some time, firstly, I thought that I would be using the AV input on the TV (but then I found that this was not a good idea, plus that's only a mono interface) and that only left one interface – the tape unit. Looking through what others had done, it be apparent that they had cut the feed into the radio module from the tape drive and then feed into this the audio output from their PC's . What this means is that when you switch the front screen to the tape drive, the audio amplifiers enable the tape input which then allows the PC audio to come out of the main speakers. This is also important because the PC software will be listening to the IBus watching for when you select the TAPE drive and once it sees this, then you can control the software from the front of the car and the audio will be amplified through the tape aspect of the car.

There are a number of things that you need to have to be able to do this properly and have high quality multimedia in your car.

## **So, the Things you Need:**

1) **A good PC** – In terms of the specification I would suggest that the minimum is:

- 700Mhz+ PentiumII/III
  
- 256mb memory
  
- As much disk space as possible (60gb+) to store MP3's and Video's.
  
- A reasonable quality audio card with headphone output – this is important to get enough gain when you connect this up to the tape input, a line out will not have enough and will require an additional pre-amp.
  
- Video output converter – if you only have a video port on the PC, your going to need a VGA to composite video converter and this must handle NTSC – PAL is not so important – more later on this.
  
- Good operating system – suggest windows XP as this is robust and pretty quick once you've streamlined it and patched it ☺
  
- Some DVD/CD ripping software – suggest looking at [www.dvdrhelp.com](http://www.dvdrhelp.com) for more information on this, although I use FairUse Wizard (freeware) for DVD ripping (converting my dvd's into compressed AVI files for storage on the laptop.

I actually use an IBM Thinkpad T20 laptop which is small and fast enough with loads of diskspace.

2) **The RS232 serial to Ibus interface** – you can buy one (see the [www.varan.org](http://www.varan.org) website for a good source) or you can make one (refer back to the previous interface circuit diagram). Go to <http://ulischirm.gmxhome.de/caramp/caramp.htm> for a more detailed look at this particular interface.

3) **A suitable power source for the PC** – this needs to be driven off of the 12v car supply – I actually have a Targus laptop 12v car adaptor for the thinkpad and have connected this to one of the sources in the rear of the car which goes live when the ignition is switched on. You can source a 12v power supply from many places (maplin.co.uk, dixons etc all in the UK) or you can look at the [www.varan.org](http://www.varan.org) website and buy an ITPS supply if you are going to install a desktop style PC. Alternatively, Go to <http://ulischirm.gmxhome.de/caramp/caramp.htm> for some other information about power supplies used by Morex PC's. <http://www.cartft.com/shop/catalog/gl/49> - Information on CarPC in general with a good solution regarding power issues (backup battery).

4) **Wire** – your going to need quite a bit of shielded wire to connect things up – the PC audio to the tape drive, the IBUS and power wires, the video etc – so you'll need some good quality shield wire.

5) **A place to fit things in the boot** – I know that seems obvious but you do need to work out where you are going to put the PC and therefore how to connect it up to the various modules.

6) **Lastly, you will need some specific BMW factory modules** – i.e. you will need to have the BMW factory video module and front TV screen and controlling button board and the radio module, plus (ideally) the Tape drive in the front of the car. This is because, as previously mentioned, the emulation software needs to have a hook into the Ibus network to enable you to engage the software from the front of the car. Hopefully no one actually uses tape anymore and you will have to cut into the tape audio lines to get the PC audio into the car in stereo and also the software that you use (CarX is what I use) needs to see a specific signal from the front screen in the dashboard of the car to know when to switch itself so that you can see it, the tape module is the perfect way to do this.

## **Good Places to Find More Information**

The best sites are:

<http://www.creative-nightshifts.com/carx.htm> - For the great CarX software – this is free (believe or not) and perfect for your multimedia installation.

<http://www.caramp.de> – for the CarAMP software – commercial software

[www.varan.org](http://www.varan.org) – For the Varan software – free, but slightly more complicated.

<http://autos.groups.yahoo.com/group/HackTheIBus/> - for the best place to get information on the IBUS and using it

<http://autos.groups.yahoo.com/group/bmwnav/> - Another good forum for IBUS info

<http://autos.groups.yahoo.com/group/openbmw/> - Another good forum for IBUS info

<http://www.cartft.com/shop/catalog/gl/49> - Information on CarPC in general with a good solution regarding power issues (backup battery).

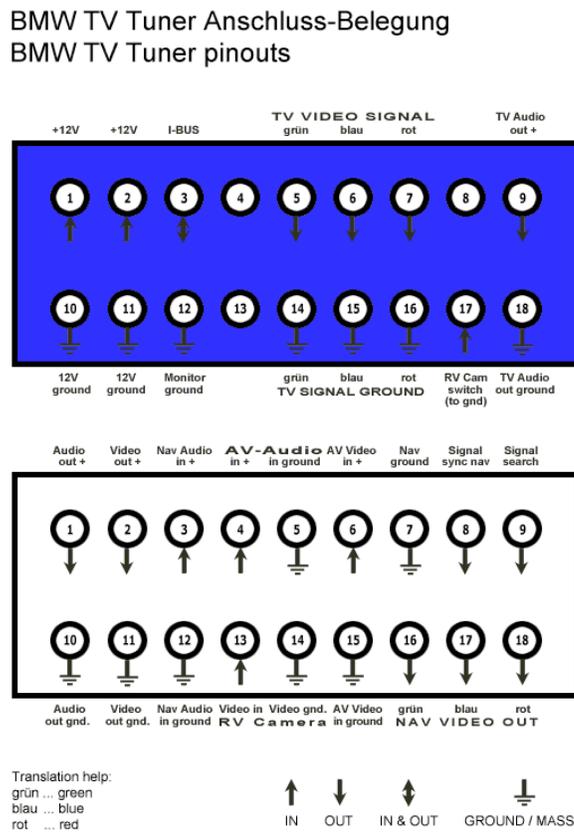
You will find a variety of other sites linked off of these sites that give you more information, but these are the key ones.

### **So, what do I do now?**

Well, probably the first thing to do is to work out what have you got in the car that you need to have, ie. The video module, radio module etc etc.

Next you need to source your PC/power supply and an Ibus interface along with a suitable video connector.

Once you have checked that you have everything that you need, then you need to locate the video module, this will have two plugs sat on top of it, see the following diagram:



Now, you need to locate the reversing camera inputs along with the reversing camera grounding pin. These are pins 13 and 14 on the white plug and 17 for the ground pin on the blue plug.

You will need to run three wires from this module, a two core (shielded) for the video and a single wire for the grounding pin. The video will run to the NTSC output from your PC's video output, whilst the ground pin (pin 17) will run to the appropriate point in the Ibus interface.

Now, you need to source the Ibus wire and a suitable +12v and ground for the Ibus interface. You can either do this from the white video plug or the small 4 wire plug on the back of the CD changer (see following diagram).

You BMW dealer will sell you the original mini cable connectors for around (70 euro cent/50 UK pence) per pin, that fit into the plugs, so there is no need to cut cables here !

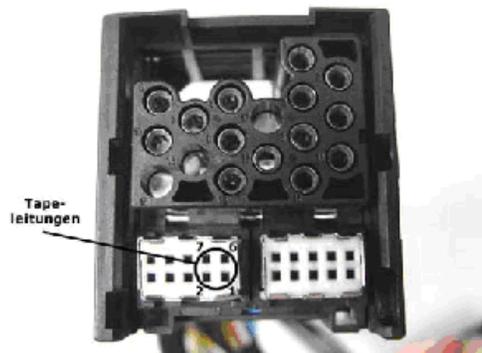


Once you have source and connected up these points, you need to connect the Ibus interface to the PC. Lastly, you need to connect the PC to a suitable power source.

The final step is to connect up the PC audio to the appropriate left and right inputs on the radio module. For this, you need to find the radio module:

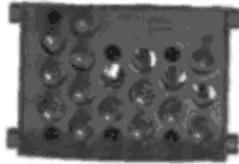
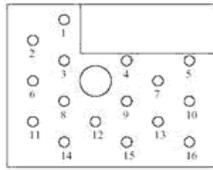


Now, you need to find the audio feeds, left and right. These wires will be dependant on which version of the radio module you have. You can check this by looking at the following diagram.

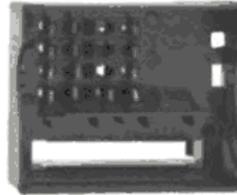
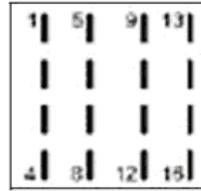


You also need to be aware that there are two versions of the radio plug, old and new. The following diagram shows the key differences between these two plugs:

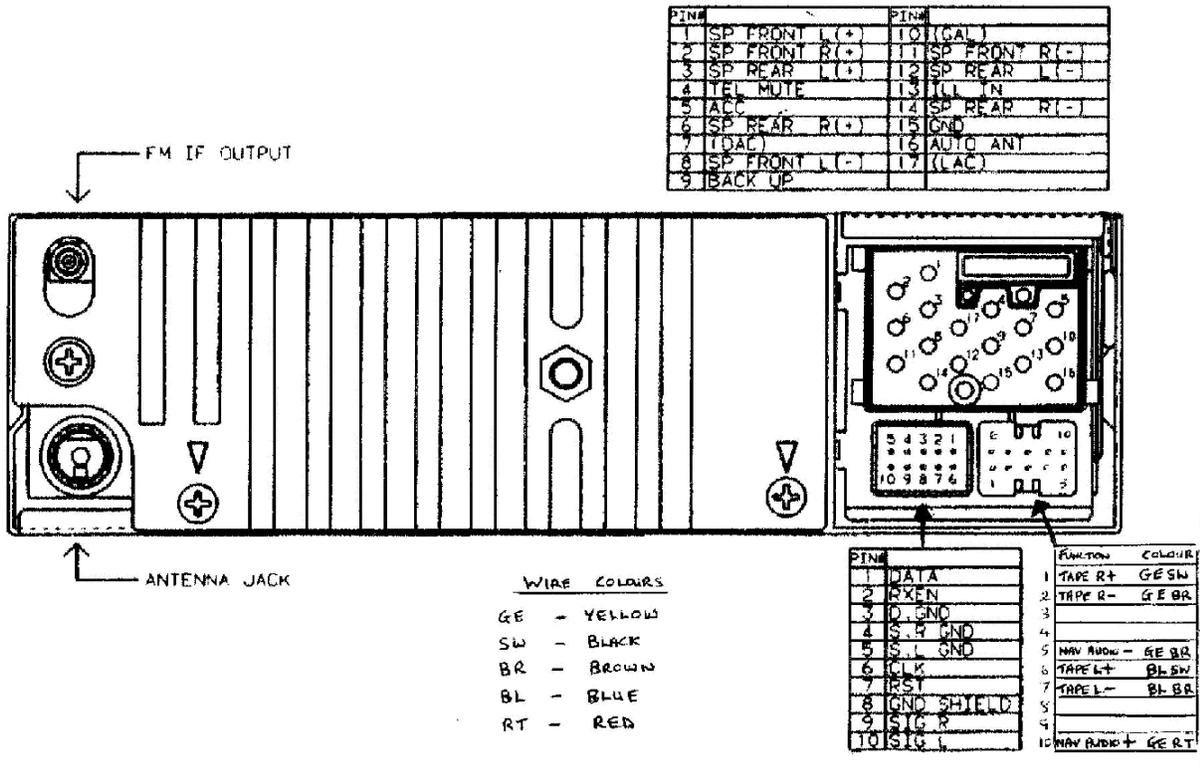
old connector  
(round pins)



"new generation connector"  
(flat pins)



For the older radio module, I found this really useful pinout diagram showing which wires to use – alternatively check out <http://ulirschirm.gmxhome.de/camp/camp.htm> for more information.

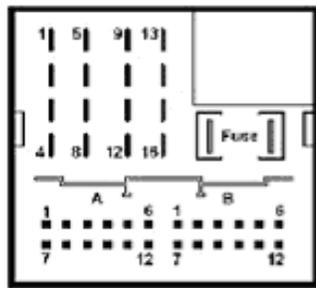


What I did at this stage was to cut these wires and simply terminate those wires that originally came into the radio module. Next, I connected the appropriate pc audio wires (left and right) into the correct pins of my radio module (the pins on the module are the inputs not outputs).

**If you have a leasing car, then it may be a good idea, to just remove the original tape cables, isolate them and put yours in, using original BMW mini connectors.**

At this point it is also worth pointing out that depending on the output capabilities of the audio on the PC you are using, you may need to install a preamplifier in between the PC and the tape audio input. I use the headphone outputs of my laptop and they are loud enough, although if I was to use the Line out instead, I would have to use an additional amplifier as this signal is far too quiet. For more information about this you might like to look at Ulrich's site.

The following diagram outlines the audio connections for the latest E39 (built around November 2002). The radio connectors sit in the very very left corner, you will have to remove other hardware to get there (unless you have very thin hands). On the big plug, there is a lever, once you have opened the lever you will find that the plug actually consists of 3 separate plugs inside it.



**Obere Kammer :**

- 1 : NF rechts hinten +
- 2 : NF rechts vorn -
- 3 : NF links vorn +
- 4 : NF links hinten +
- 5 : NF rechts hinten -
- 6 : NF rechts vorn +
- 7 : NF rechts vorn -
- 8 : NF rechts hinten -
- 9 : Kil Bus Anschluss
- 10 : Telefon Mute
- 11 : Signal Telefon ein
- 12 : Klemme 31- Masse
- 13 : Schaltsignal (Ant., Verst.)
- 14 : Klemme 5B- Beleuchtung
- 15 : Klemme 30- Dauerplus
- 16 : Klemme R Zündung

**Kammer A :**

- 1 : nicht genutzt
- 2 : CD-Wechsler NF -
- 3 : nicht genutzt
- 4 : VCR NF rechts +
- 5 : VCR NF links +
- 6 : VCR NF -
- 7 : nicht genutzt
- 8 : CD-Wechsler NF links +
- 9 : CD-Wechsler NF rechts +
- 10 : TV NF rechts +
- 11 : TV NF links +
- 12 : TV NF -

**Kammer B :**

- 1 : Tape NF links+
- 2 : Tape NF links -
- 3 : nicht genutzt
- 4 : nicht genutzt
- 5 : Navigations / TV NF +
- 6 : Telefon +
- 7 : Tape NF rechts +
- 8 : Tape NF rechts -
- 9 : Navigations-Bus
- 10 : nicht genutzt
- 11 : Navigations / TV NF -
- 12 : Telefon -

The connections you will need to use are located in plug B, Pins 1,2,7 and 8, “-“ stands for minus or GND.

**Initial Connections all Made – Now to the software**

Once this is done, then you can now do a check that things are working. So which software to use??

There are three good ones that I have found:

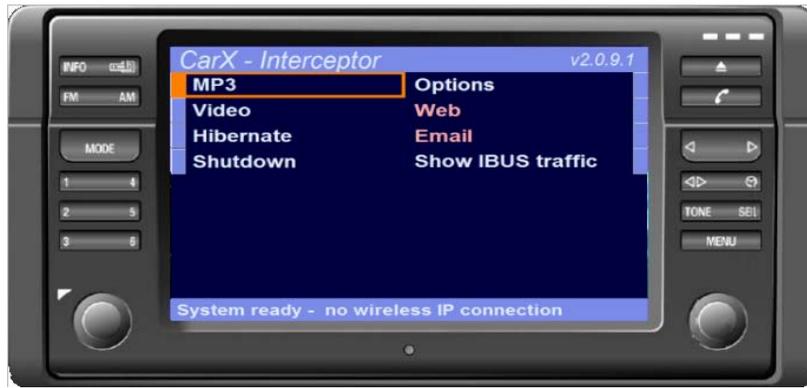
- 1) CarX – [www.creative-nightshifts.com](http://www.creative-nightshifts.com)
- 2) CarAMP – [www.caramp.de](http://www.caramp.de)
- 3) Varan – [www.varan.org](http://www.varan.org)

For me, I wanted a package that could play the MP3 files, along with various video files and also if required, the DVD (although not as important).

I found Varan to be complicated in the way that it worked and still couldn't get things quite right. I then tried CarAMP, but to be honest it is quite expensive, although it works well. But the biggest problem for me was that CarAMP needs to have the .Net framework installed, which seems overkill for a multimedia PC.

Then I tried CarX, and initially it seemed good, but there were a few things that didn't seem quite right. Then I mailed the hacktheibus group and got the answers I wanted (I wasn't connecting things right) and I also got an email from Andreas Faltinek, the developer. And that was what really helped me, because whilst Andreas may provide the software free, he still cares about people who use it and I have to say that he answered every question I ever had along with actually developing new features and functions that I had asked for – this is a very rare quality to find – a developer that already has a great package actually reacting quickly to people who use their software.

This, for me, really sealed which package to use – CarX.



CarX is a well thought out package that does not hammer the PC processor, it does not require any additional software apart from the usual Windows Media player and the Arial Narrow font. I run it on Windows XP, but have also tried it on Windows 2000 with no problems.

It plays MP3 (MP3, WMA, WAV) files and also video files (MPEG, AVI – DivX, XviD – in fact any CODEC you care to use). It also allows you to tailor the colour and look and feel according to different types of car you run it in, e.g. traditional BMW computer look (E39), new Idrive look, plus some other alternative looks as well. It even allows to rearrange the main screen with any bitmap you want, and then move the menu items around to look nice. Andy's website shows you that you can have CarX looking like iDrive if you want or even a "porsche" screen (for fun only !)

CarX also contains an email client and a web browser so that if you have a wireless connection or Bluetooth from your PC to say a GSM phone with GPRS then you can download your emails and browse the internet from the front of your car.....how cool is that! Mouse moves and clicks are done by some numeric buttons (check the table below)

CarX is very customisable according to your taste, screen size etc. But to honest I found that the default settings were just perfect. It just goes to show that the developer knows what he is doing.

## **Installation Details**

Installing CarX is really easy, you simply have to unzip the package into a suitable folder and then double click the CarX.exe file to run. I actually set up a shortcut to the Carx.exe file and put that in my startup folder so that it automatically starts when WindowsXP boots up.

The other component you should install is the Arial Narrow font – a freely available font and will ensure that all the menu options are properly rendered on screen.

Lastly, you should install any codec's that are required to playback your video content. A simple way to test this is to make sure that you have a relatively recent version of the Windows Media player installed and then open the video file(s) in Windows XP, this will then open the file into media player whereupon if it plays then it will play in CarX.

## **Configuration Details**

The key for any of these packages is that they need to react to the user pressing the MODE TAPE button on the front button board (dashboard) which then causes the Tape unit to switch on (NOTE: you must have a tape in the drive at all times), this then causes the car amplifier to engage the tape module (which now has the PC audio connected instead) and at the same time the software sends out a positive feed on the RTS line of the serial to Ibus interface which will then switch over the relay and provide a GND feed to pin 17 of the video module (blue connector) and thus switch over the video screen to the reversing camera input (which now has the PC's video signal on it).

To get this to work, you need to tell the software the code for the signal being used when you press that MODE-TAPE button (this is when you press the MODE button numerous times until the tape drive engages). For me, the code provided with CarX for the tape drive (BMW\_TAPE=68 04 3B 46 0C 75 in the CarX.ini file, as it works in Andy's car) did not work. And caused some frustration, but there is a light at the end of this particular tunnel as Andy pointed out to me....

The key was to use the CarX Ibus analyser utility. I switched on the analyser utility and then got my very patient Wife to press the front MODE button until the TAPE drive engaged. I did this a number of times until I got a series of similar codes on the text file traces that CarX can produce and then narrowed them down and tried them until I found the one that was consistently sent out every time. Some people have done similar things, but the message may not always be sent immediately, the one I found means that you must have the dolby B switch engaged, but once you have this then switching over the TAPE drive using the MODE button creates this message every time, instantly.

So whatever the code is, that YOUR car shows, copy/paste it into the carx.ini file replacing the XX'es:

```
[codes]
BMW_TAPE=XX XX XX XX XX XX XX XX
BMW_BMW_Tone_Press=F0 04 68 48 04 D0
BMW_Radio_Power_Press=F0 04 68 48 06 D2
BMW_FM_Press=F0 04 68 48 31 E5
BMW_AM_Press=F0 04 68 48 21 F5
BMW_Menu_Press=F0 04 FF 48 34 77
BMW_Menu_turnknob_Press=F0 04 3B 48 05 82
BMW_Menu_turnknob_Counterclockwise=F0 04 3B 49 0
BMW_Menu_turnknob_Clockwise=F0 04 3B 49 8
BMW_01_Press=F0 04 68 48 11 C5
BMW_02_Press=F0 04 68 48 01 D5
BMW_03_Press=F0 04 68 48 12 C6
BMW_04_Press=F0 04 68 48 02 D6
BMW_05_Press=F0 04 68 48 13 C7
BMW_06_Press=F0 04 68 48 03 D7
BMW_Wheel_Up_Press=50 04 C8 3B 01 A6
BMW_Wheel_Down_Press=50 04 C8 3B 08 AF
BMW_Select_Press=F0 05 FF 47 00 0F 42
BMW_TP_Press=F0 04 68 48 32 E6
BMW_Clock_Press=F0 04 FF 48 07 44
BMW_RAD_TEL_Press=50 04 FF 3B 40 D0
BMW_RAD_NAV_Press=F0 04 68 48 30 E4
BMW_Mode_Press=F0 04 68 48 23 F7
```

For your information, if you have a UK E39 2001 model with the same modules as I have installed (see the start of the document for the list), the TAPE unit sends out this code (BMW\_TAPE=F0 05 68 4B 06 84 54) when you switch on the Tape drive – make sure that you have enabled the DolbyB noise reduction button for this to work (once you have switched onDolbyB it will stay on). This is a good message as it is sent out immediately you switch on the tape unit or switch too the tape unit from the radio/cd.

The key to these messages, for me, was that they do seem different from country to country, but the point is not to loose hope. Another tool I also used was THE Ibus analyser by Frank Touanen which can be downloaded from this address ([http://sourceforge.net/project/showfiles.php?group\\_id=81372&package\\_id=103255](http://sourceforge.net/project/showfiles.php?group_id=81372&package_id=103255))

Once you have found this, pretty much everything else is now sorted. You should now find that the software reacts to the left number buttons and the right hand knob controller instantly.

Another point to note is that depending on how big the black frame around the edge of your screen (the Graphics card or NTSC converter may cause this ) check out the scaling facility, to centre the CarX screen and use all available space on the screen (very handy !!).

## **CarX Controls**

For CarX, the controls are as follows:

<b>BMW buttons – either side of the TV screen</b>	<b>Webbrowser</b>	<b>Playing Videos</b>	<b>Playing MP3's</b>
INFO button		Not used YET	Not used YET
1 button	<b>Mouse click</b>	<b>(darker)</b>	Pauses playback
2 button	<b>Mouse left</b>	Not used – use the right hand know	Play previous MP3

3 button	Not used	Not used – use the right hand knob	Rewind current MP3
4 button	<b>Mouse up</b>	(Brighter)	Randomize (=play any file in the directory)
5 button	<b>Mouse right</b>	Not used – use the right hand knob	Play next MP3
6 button	<b>Mouse down</b>	Not used – use the right hand knob	Fast forward current MP3
AM/FM button	Switches to radio	Switches to radio	Switches to radio
MODE button	Switches to Radio or CD	Switches to Radio or CD	Switches to Radio or CD
Left Hand Knob – push	Switch off TAPE and show main BMW computer	Switch off TAPE and show main BMW computer	Switch off TAPE and show main BMW computer
Left Hand Knob – rotate	Volume of MP3	Volume of movie	Volume of MP3
Eject button	Remove tape and show main BMW computer	Remove tape and show main BMW computer	Remove tape and show main BMW computer
Telephone button	Not used	Not used	Not used
< and > button	Not used	Not used	Not used
TONE button	Pauses the playback and allows you to change the bass, treble etc	Pauses the playback and allows you to change the bass, treble etc	Pauses the playback and allows you to change the bass, treble etc and toggles MP3 playback (Hit TONE twice and you can change bass etc. while MP3 is playing !
MENU button	Switches back to the main BMW computer and toggles MP3 playback	Switches back to the main BMW computer and halts movie playback	Switches back to the main BMW computer and toggles MP3 playback
Right hand knob – push	Select Menu	Select menu	Select Menu
Right hand knob – rotate	Not used	FF or RR movie	FF or RW MP3
Steering wheel button UP (in phone mode, not in tape mode, because tape mode will only ff the original tape deck !) Have to toggle between Tape and Phone before this is ready). So using this will also scroll thru the phones register – so what	Next MP3 file	Not used	Next MP3 file
Steering wheel button Down (phone mode)	Previous MP3 file	Not used	Previous MP3 file
Steering wheel Air condition button TOGGLE open/close (the one you use when driving behind a truck, to no longer allow outside air to get into the car)	Randomize (like button “4”)	Not used	Randomize (like button “4”)

## **Extra CarX Configuration Parameters**

There are some additional configuration parameters that you can put into the CARX.INI file to change the way that CarX operates.

There are a number of additional hidden options that allow you to configure the more advanced features of CarX, to enable any of these options you need to add the appropriate command to the end of the shortcut that you use to startup CarX. E.g. "c:\program files\carx\carx.exe" /forcescreen

You should only really need to use these option when trying to track down an installation problem.

### **/HIGHPRIO**

Carx will set its own thread priority to high – use this, if there is something else running on your PC that tends to eat CPU-resources, e.g. a virus scanner (if you do not want to disable it).

### **/TIMERS**

All timer events will appear with an entry in the IBUS log – only useful for bug-fixing with the developer...

### **/TRACE**

Even more tracing if you can't find the code your looking for in the normal mode, it may also help Andy to support or fix a bug. Normally you should not use TRACE as it causes additional CPU-utilization.

### **/COM2**

If you use COM2 as IBUS port you will need to put this into the INI file

### **/SAVEMEMORY**

Do not build the MP3-filelist for random picks (only add this one if you do not have enough memory – Andy had a 64MB memory-system with 80GB of MP3 – when he build the file list, there was not enough memory left for video playback, and the system started to page in and out too much, causing the video to freeze every second or so)

### **/FORCESCREEN**

At startup, the blue screen ("click me or hit tape" ) will not appear anymore

## **Sounds**

CarX allows you to also customize some sounds that will be played, if the files are there and named correctly:

carx_start.wav	(played when CarX starts up)
carx_hibernate.wav	(played when CarX hibernates windows)
carx_shutdown.wav	(played when CarX shuts windows down)
invalidfile.wav	(played, when a movie file can not be loaded)
ip found.wav	(played, when CarX detects an IP connection)
no ip.wav	(played, when CarX loses an IP connection)
loadingmovie.wav	(played, when CarX starts a movie)
accessingemails.wav	(played, when CarX attempts access to the mailbox )
noconnections2mailserver.wav	(when the mail access fails)
downloadcompleted.wav	(when all mails are downloaded)

## **Showing images of your favourite stars while playing MP3**

CarX will check if in the path where it resides there is a sub-directory called \stars (e.g. "c:\program files\carx\stars") If so, it will scan thru it and build a list of all files it finds e.g.

avril.jpg  
ac-dc.jpg  
buena.jpg  
comedian.jpg  
ferrer.jpg  
....

If e.g. a file like “Buena vista social club – aquellos ojos verdes.mp3” is played, then CarX will check, if any of the images matches, and obviously “buena” is contained in the MP3-title. In that case, the image will be displayed on the screen that shows when MP3 is played. If there is more than one match, then the first match hits, e.g. a picture like ojos.jpg will not be shown with the file mentioned above. Size of the image should be squared 200x200 pixels. Bigger ones will be scaled down and hence eat too much memory resource.

## **Update**

The installation works perfectly now. In fact I have now installed a second screen behind the main centre console of the car that feeds off of the video and audio signals from the PC in the boot, so the kids can watch in the back of the car. If you want to add additional screens to your installation, you will have to install an AV Splitter/amplifier unless your PC video output has the ability to connect to multiple screens at once. This will allow you to connect more than one screen to the output of your PC (composite NTSC), otherwise when you connect up the second screen the view will become very poor (the colours will become blurred along with the brightness dropping).

I also fed through a multicore cable from the boot to enable me to switch on and off the PC from the front of the car and also I put a hidden switch in the little compartment next to the handbrake so that I can startup CarX and set a movie running and then flick a switch and the front screen goes back to the main BMW computer whilst the back screen carries on playing the movie. The switch disconnects the ibus and pin 17 ground wires from the PC Ibus interface, which means that the front screen goes back to the main BMW computer and anything I then do on the screen/buttons does not affect the PC as it can't see any Ibus messages anymore. Flicking the switch back reconnects everything and I can then interact with CarX once more. ☺

## **ACKNOWLEDGEMENTS**

I would like to thank the following people that helped me to install CarX and a PC into my car and get high quality multimedia running.

**Andreas Faltinek** – CarX development and free download - <http://www.creative-nightshifts.com/carx.htm>

**Andy has asked me to put in special thanks to his wife Andrea for her patience with him.**

**Frank Touren** – Ibus analyser - [http://sourceforge.net/project/showfiles.php?group\\_id=81372&package\\_id=103255](http://sourceforge.net/project/showfiles.php?group_id=81372&package_id=103255)

**Ulrich Schirm** – for the really good informative website <http://ulirschirm.gmxhome.de/caramp/caramp.htm>

**And Everybody else** – For the great help and information on the Hackthelbus Yahoo group.