Build Your Own CarPC

If you have seen the latest BMW 7 series you may have seen the onboard computer systems. All very nice if you have forty five grand to spend, but what if you don't?

Enter the CarPC or as it's also know the Carputer. These are custom PC systems designed by amateurs for use with in their cars or trucks. Although has been mainly a US based hobby there are a growing number of people in the UK and the EU now creating their own systems. The CarPC has grown from early MP3 (music stored as files on your hard disk) players in the car to full blown customized systems which some major car manufactures such as Opel on main land EU now offer as an option when you buy a new car.

Normally you have a LCD display for those systems that only play music or on the more advanced setups a colour LCD touch screen display. At the hart of the system you will find a normal PC. Here you can use any thing you want however always remember you need good ventilation for it. The other main part to an advanced system is a GPS (Global Positioning System) receiver. Most receivers will be OK however check with your seller that it works with your chosen application. Destinator gives the closest to an OEM install however you can look also at Microsoft Mappoint as well, both integrate very well with most CarPC applications.

As far as software goes Windows XP tends to be the main choice for an Operating System although MAC and Linux versions have been done before. Once the Operating System has been installed you simply install the CarPC application you want (eg. Media Car, MediaEngine, CarBox etc). This is all then mounted in your car and connected to your In Car Entertainment (I.C.E) system and your done.

The functionality you can expect is only limited by your imagination. Typically you can expect with the right hardware and some software to have MP3, movie player and GPS functions however with home grown applications such as PhoneControl.NET to control and use your mobile phone via Bluetooth they can be expanded on.

There is no reason you can't design your own custom case for the PC to slotted in to an area in your car so it appears part of the stock equipment however this takes time. If you would prefer to buy off the self items then look at the Mini ITX form factor and cases. Most of these are very small compared to normal desktop machines however as such they tend to cost a little more in comparison.

Most of the hardware you will need can be bought very cheaply either from the web or even EBay however be aware that certain items carry higher tax rates should you order from outside the UK so check before you order.

There are a number of communities around the web dedicated to this hobby. Most on these sites will help 'newbies' however do search the forums first before asking the questions as they do tend to be asked all of the time. In the case of mp3car they even set a newbie area up.

Terran (Ayce) Brown

By Terran Brown – webmaster@letscommunicate.co.uk

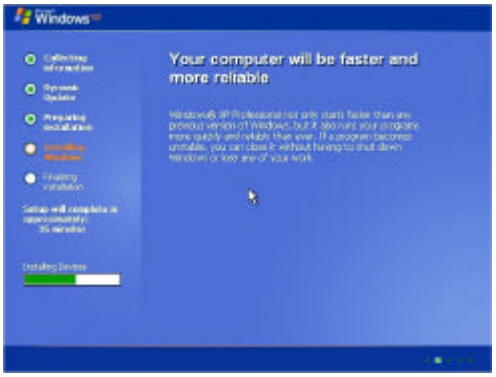
(DON'T USE YOUR CARPC WHILE DRIVING)

1) Before you start your installation you must make sure that you're happy you know your way around its electrical systems and panels. There are a lot of open forums for different makes such as www.vvoc.co.uk in the case of this Vectra. Spend the time on research as you will find it pays off later.

2) You don't have to think small as all installations are different but it does help. In this case we are using a Cupid 2688R case with a VIA ITX board. This does not leave much room in-side however using smaller components such as a laptop hard drive and a bit of time much can be fitted in.

By Terran Brown – webmaster@letscommunicate.co.uk

3) This is the easy part of the installation. Much of the install is the same as building a new PC however bear in mind that it's worth running scandisk and defrag around three times each once your install is complete for speed reasons.



4) As there are so many of these applications now coming from home developers you need to try a few. Most of these are skinnable (you can change the way they look) and most have dedicated home sites. Again use the forums to gage other users experiences with each of the applications.

By Terran Brown – webmaster@letscommunicate.co.uk

5) You will find while you are installing the now ready system that you will have excess cables and other items such as USB hubs. This is where behind the space dash board can be useful however be aware of heating or AC elements etc and don't put anything in there which may be a potential fire risk.

6) You more than likely need to supply power, audio, video and USB feeds to the rear of your car if you use this configuration. Make sure that the high voltage cables you will need are separated from the audio feeds to prevent interference. You may want to use a mains three pin socket and plugs to allow the CPU to be quickly removed.

By Terran Brown – webmaster@letscommunicate.co.uk

7) While driving you do not want any of your equipment moving around. The easiest way to mount the CPU is by using Velcro. It sticks to the carpet and itself to provide a secure but easily removable method. The cables are then tied and secured underneath the carpet for neatness.

8) First of all visit www.dashmount.co.uk for one of their custom brackets. They allow you to have a quick and secure way of mounting your screen however you may need to modify the mounting clamp that comes with your screen. This also gives the professional touch to the install that others will see. Lastly try and get a VGA screen rather that a composite monitor as it's able to display higher definition images.

By Terran Brown – webmaster@letscommunicate.co.uk

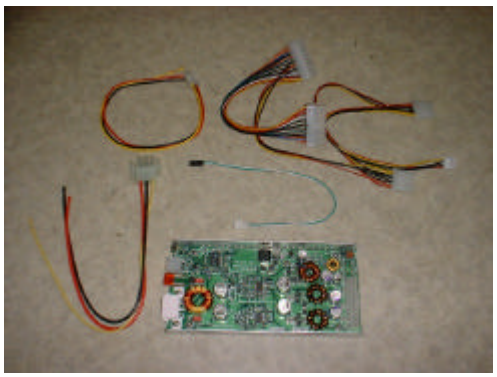
9) Make sure the GPS you plan to use is compatible with your intended application. EBay is a good source for USB GPS units which when used with a USB hub in the dash makes life easy for cabling. Although some brands take more power most work with the same standards however check and find out if you car has heat reflective film in the windows as this can sometimes affect the quality of the signal.

10) How well this part goes depends on the remote and the application to be used. Mostly though you will need to use Girder and a script file to replicate key presses to the application. You may find others have already created the scripts you need however if not review the Girder web site.

By Terran Brown – webmaster@letscommunicate.co.uk

11) If you have a high specification car radio then you may find it has an auxiliary port on it (possibly left and right phono plug leads). If you have this is the best way to get sound in to your system however as most reading this will only have a stock radio then an FM Modulator is the best option. Available from EBay for around £25-35 it's easily connectable and all you need to do is tune your radio in.

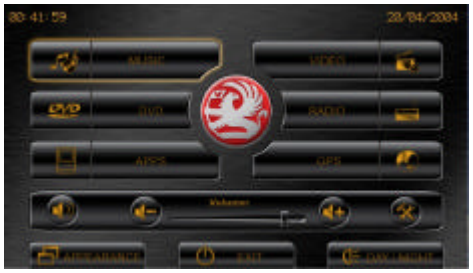
12) There are several options available depending on the amount you spend however it is widely recognised that the power supply from Opus Solutions is among the best. With power direct from your car and then to the PC Motherboard it controls the start-up and shutdown of the system as well as maintaining a stable voltage.



By Terran Brown – webmaster@letscommunicate.co.uk

13) You now need to copy your media files to your system. Something to watch for is that the software you are using can work with the file types e.g. *.wma as most of these programmes rely on external applications. If you are using the Ethernet ports remember that you need a 'cross over' cable if you are not using a hub for the network connectivity.

14) First of all look and see if a skin that you like has already been created. If its not then you will need to spend time depending on how good you are at with graphics and also learn how the skinning application (if available) works. The principal is basic animation with layers however with time you can create a very unique look.



By Terran Brown – webmaster@letscommunicate.co.uk

15) Once your new system is complete remember you need to perform maintenance on it like any PC and to back up everything as the time you spend tweaking adds up. Lastly be aware that safety is important as it is not really legal for the driver to be watching the latest DVD release while driving down the M6 ;)

Useful Web Links

www.letscommunicate.co.uk/carpc/
www.digital-car.co.uk
www.mp3car.com
www.thisstrife.com/carproject/
www.opussolutions.com
www.destinator1.com
www.routeplanners.co.uk
www.mini-itx.com
www.cpc.com
www.cartft.com
www.mediaremote.com
www.girder.nl

By Terran Brown – webmaster@letscommunicate.co.uk

CarPC / Carputer Planning Basics

The PC System

In some ways you can do what you want here but using small systems based on the Mini ITX or MINI ATX form factors are ideal due to the size of the units. In-fact the new VIA Nanoboard's are so small they can go practically anywhere at all. This been said there is no reason you can not mount a larger full ATX system however you do need to make sure it is secure and there is plenty of ventilation. The best thing to do here is to simply get measuring tape out and look around at different cases. For the most part this will not be seen however some places to consider installing: -

In the dash: If you go for an ITX PC such as the Casetronic Travla you can install the PC with-in the DIN slot of the dash board. This is OK and looks good however in our time it's not very security wise.

In the glove box: Here you may need to a little hacking if you don't use a MINIITX system or MINI ATX. This is due to the size however the problem here is ventilation as you may find your system overheating. Some newer cars feature AC ventilation of the glove box however it is not ideal

Under the seat: This is an ideal place if you want to be able to access your system quickly. The main down side here is that you may need to remove the seat to fix the PC to the car correctly so it does not move about. This is OK if you intend to leave it there however should you need to do any work on it you may find it is not worth the hassle.

In the boot: This is the ideal mounting place however it does require a lot of work to install the cables away from view. It is also ideal from the security point of view as it can not be seen by anyone. Lastly the best part about mounting in the boot is that most modern cars have lot of nooks and crannies for installing your unit and keeping the boot space free. These can include where your CD stack should be or even using the spare space where your 5th wheel is.

It is also worth mentioning that when choosing your system you need the fastest CPU and drives however depending on your use the maximum of 256mb memory is needed. Why? Because if you use the hibernation function it takes longer to shutdown and start-up. This is due to the large amount of data in use, again this is dependent on the software you are running so try and find what is best for you and your system. The easiest way to help relieve the stress of the system is to install a dedicated video card taking the load away from the CPU and system memory.

By Terran Brown – webmaster@letscommunicate.co.uk

The Screen or LCD

The best looking solution is a colour touch screen like many of those found on high end GPS systems. There are two types of colour screens available. The first is a composite type where the signal inputted is the same quality as that used on video recorders and TV's. Although they are cheaper and easier to install as they need only one cable to feed the signal. However the best screens are those that accept the higher quality VGA signal. Although there are some very expensive units such as the Xenarc's the best unit for its money is the 7" Lilliput clone Unit from CarTFT. The monitor simply connects to the VGA port of your machine and a spare USB port. Very simple drivers are needed to activate the touch screen part – once these are installed it's a very simple case of calibrating by following the on screen instructions.
There are a number of resolutions for that however one of the best is 848x480 as it gives true widescreen views. It is worth checking your cards drivers to see if they have the ability for custom resolutions however if it does not you may want to look at either TVTool or Powerstrip to help. Lastly if you are able to you may want to mount the screen in to the dash so it gives it the professional touch. This may mean some fibre-glassing or carpentry however there are no rules to how this is really done other than what looks good.

By Terran Brown – webmaster@letscommunicate.co.uk

GPS & GPS Software

The choices here are a bit limited as this is not currently a hobby for the masses. There are a few applications out there which are good GPS mapping programmes however are not designed directly for use in a car environment. Also they are not really the weapon of choice for CarPC enthusiasts. So what is? The first been MS Mappoint which is basically MS Autoroute with a developers interface to control it from another application. The second is the more OEM looking Destinator. Although very well known for GPS within the PPC (Pocket PC) market they do have a little known PC version. Currently version two is out however version three for the PC is in development and promises the best 3D views and new functions yet. Again this is an application that can be controlled from another application however because of the price not many people get it therefore the developers (who mostly do this for free) don't always support it. At this time MediaCar and CarBox supports both of these GPS applications with Media Engine only supporting MS Mappoint all though development for support of Destinator is currently under way.

Power Supply

This is the tricky one. Many hours have been spent on the forums looking at which power supplies are the best for the job. There are many variations out there, some are home brew some are not but most generally only offer a clean power supply. There are few which are more intelligent such as the Opus which can control the start-up and shutdown of your machine along with your car. The Opus itself is only available from one company in the states for ATX and ITX systems it is however widely recognised that the Opus products are among if not one of the best in this field. The Opus also monitors the car battery to ensure that it is never drained as well as the 90w version being small enough to fit with-in an ITX case. The only downside to these is the high cost (around £130) plus the import tax (around the £20 mark) however the result is definitely worth it.

By Terran Brown – webmaster@letscommunicate.co.uk

Remote

There a number of ways to implement your remote. The most common way is to use a well known application called Girder. Girder can be used with virtually any input device and then via a series of scripts perform an action or a series of actions. The application itself is very powerful but the basic principle is that you press a button on the remote, Girder senses this, checks its script and then simulates a predetermined key press to that application. It is well worth spending some time on the Girder forum or even asking if others have scripts to share on the CarPC forums themselves.

By Terran Brown – webmaster@letscommunicate.co.uk

Software

There are DOS, Linux, Embedded XP and even MAC systems out there however for the PC's the most popular systems consist of Windows XP and one of the following:-

Mediacar – Highly skinnable (e.g. create your own look), very powerful and has a growing following. Excellent support for GPS apps.

Media Engine – One of the original Windows based CarPC applications. It is a very good and well tested application and if you're looking at an MP3 only system this may ideal as the GPS support is very minimal although this is being worked on.

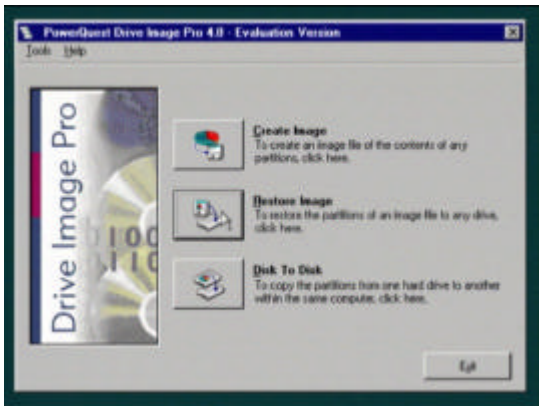
CarBox – A UK offering and a fairly new comer however supports Destinator and has a very easy interface. The new skinner app goes along way to assist the end user

All of these applications are skinnable however for the most part unless you are prepared to hone your artist skills you may want to look at the existing skins that are available from each of their own home sites. However if you feel adventuress then you can create a skin that looks and reacts exactly as you expect.

By Terran Brown – webmaster@letscommunicate.co.uk

Extras like Drive Imaging Software

Finally, consider when things go wrong. A lot of time and effort may be put in on creating your system – what if it fails ? Ideally you need a package that can restore a snapshot of your system at anytime – effectively resetting it. Look at getting an off the shelf package such as Norton's Ghost or Power Quests Drive Image. These give you a number of different options for backing your drive image up and restoring it



Useful Web Links

www.tvtool.info/index_e.htm
www.entechtaiwan.com
www.norton.com
www.powerquest.com
www.mp3car.com/software.php
www.media-car.fr.st
www.mediaengine.org
www.stuffandting.com/carbox/

By Terran Brown – webmaster@letscommunicate.co.uk